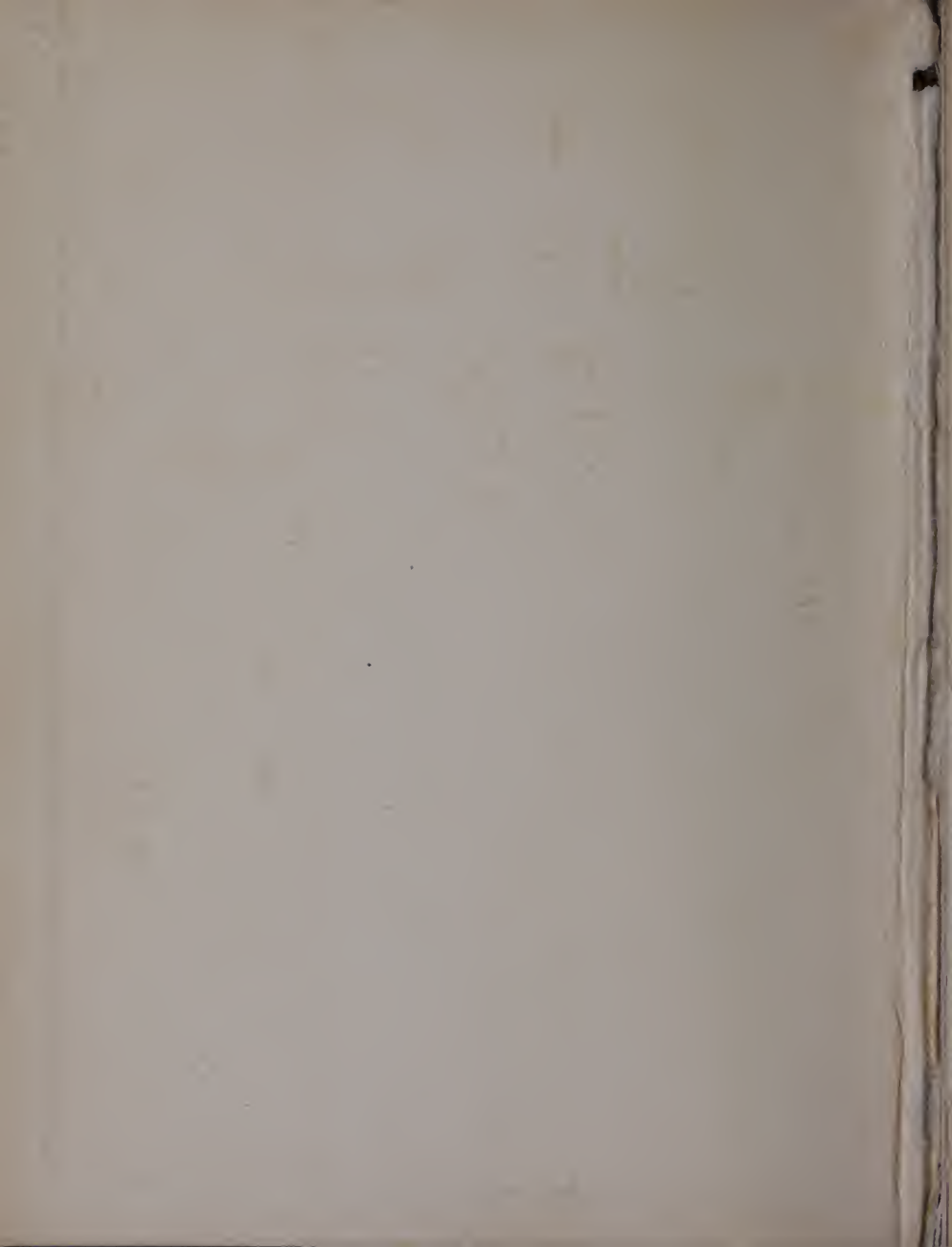


WOOD'S

NATURAL HISTORY





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ILLUSTRATED

# NATURAL HISTORY

FOR YOUNG PEOPLE

BY THE

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AUTHOR OF "THE NEW ILLUSTRATED NATURAL HISTORY," ETC., ETC.

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ALICE IN WONDERLAND.

# NATURAL HISTORY.

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## QUADRUMANA; OR, THE MONKEY TRIBE.

**T**HIS section includes the apes, baboons, and monkeys. The name is given to these animals because, in addition to two hands like those of man, their feet are also formed like hands, and are capable of grasping the branches among which most monkeys pass their lives.

Apes are placed at the head because their instinct is mostly superior to that of the baboons and monkeys, of whom the former are usually sullen and ferocious, when arrived at their full growth, and the latter volatile and mischievous.

The first in order, as well as the largest of the Apes, is the enormous ape from Western Africa, the GORILLA. The first modern writer who brought the gorilla before the notice of the public seems to be Mr. Bowdich, the well-known African traveller; for it is evidently of the gorilla that he speaks under the name of Ingheena. The natives of the Gaboon and its vicinity use the name Gina, when mentioning the gorilla. The many tales told of the habits, the gigantic strength, and the general appearance of the Ingheena, are precisely those which are attributed to the gorilla.

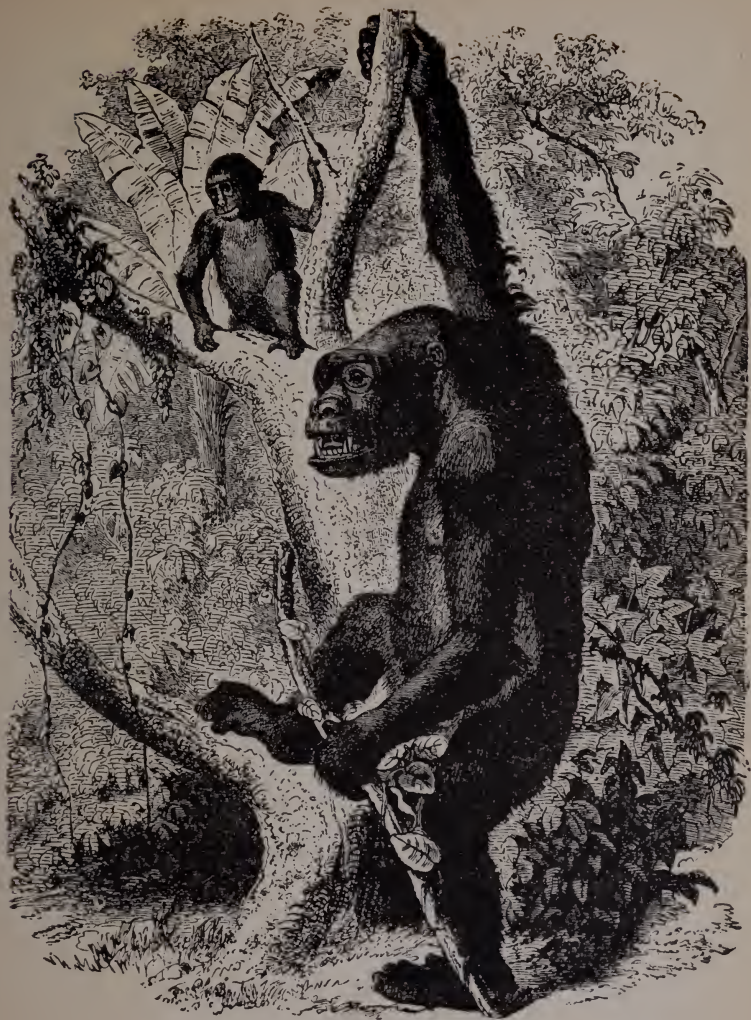
As to the habits of the gorilla many conflicting tales have been told, and many have been the consequent controversies. In order to settle the disputed questions, Mr. Winwoode Reade undertook a journey to Western Africa, where he remained for a considerable

time. After careful investigation, he sums up the history of the animal as follows:

“The ordinary cry of a gorilla is of a plaintive character, but in rage it is a sharp, hoarse bark, not unlike the roar of the tiger. Owing to the negro propensity for exaggeration, I at first heard some very remarkable stories about the ferocity of the gorilla; but when I questioned the real hunters, I found them, as far as I could judge, like most courageous men, modest, and rather taciturn than garrulous. Their account of the ape's ferocity scarcely bears out those afforded by Drs. Savage and Ford. They deny that the gorilla ever attacks man without provocation. ‘Leave Njina alone,’ they say, ‘and Njina leave you alone.’ But when the gorilla, surprised while feeding or asleep, is suddenly brought to bay, he goes round in a kind of half-circle, keeping his eyes fixed on the man, and uttering a complaining, uneasy cry. If the hunter shoots at him, and the gun misses fire, or if the ape is wounded, he will sometimes run away; sometimes, however, he will charge, with his fierce look, his lowered lip, his hair falling on his brow. He does not, however, appear to be very agile, for the hunters frequently escape from him.

“His charge is made on all-fours: he seizes the offensive object, and, dragging it into his mouth, bites it. I heard a great deal about men being killed by gorillas, but wherever I went I found that the story retreated to tradition. That a man might be killed by a gorilla I do not doubt for a moment, but that a man has not been killed by one within the memory of the living, I can most firmly assert.

“I once saw a man who had been wounded by a gorilla. It was Etia, the Mchaga hunter, who piloted me in the forests of Ngumbi. His left hand was completely crippled, and the marks of teeth were visible on the wrist. I asked him to show me exactly



THE GORILLA.

how the gorilla attacked him. I was to be the hunter, he the gorilla. I pretended to shoot at him. He rushed toward me on all-fours, and seizing my wrist with one of his hands, dragged it to his mouth, bit it, and then made off."

The CHIMPANZEE is a native of Western Africa, and is tolerably common on the banks of the Gambia and in Congo.

Large bands of these formidable apes congregate together and unite in repelling an invader, which they do with such fury and courage that even the dreaded elephant and lion are driven from their haunts by their united efforts. They live principally on the ground, and, as their name imports, spend much of their time in caves and under rocks. Their height is from four to five feet, but they are said not to reach this growth until nine or ten years of age.

Several young chimpanzees have been imported into this country, and have shown themselves very docile and gentle.

The ORANG-OUTANG inhabits Borneo and Sumatra. In Borneo there are certainly two species of orang, called by the natives the Mias-kassar and the Mias-pappan. Some naturalists suppose that the Sumatran orang is also a distinct species. This is the largest of all the apes, as it is said that orangs have been obtained from Borneo considerably above five feet in height. The strength of this animal is tremendous; a female snapped a strong spear asunder after having received many severe wounds. Its arms are of extraordinary length, the hands reaching the ground when it stands erect. This length of arm is admirably adapted for climbing trees, on which it principally resides. Mr. Brooke, the Rajah of Sarawak, gives the following account of the orangs of Borneo. There appears also to be a third species, the Mias-rombi:

"The orangs are as dull and slothful as can well be conceived, and on no occasion, when pursuing them, did they move so fast as to preclude my keeping pace with them easily through a



ORANG-OUTANG—OLD AND YOUNG.

moderately clear forest ; and even when obstructions below (such as wading up to the neck) allowed them to get away some distance, they were sure to stop and allow us to come up. I never observed the slightest attempt at defence ; and the wood, which sometimes rattled about our ears, was broken by their weight, and not thrown, as some persons represent. If pushed to extremity, however, the pappan could not be otherwise than formidable ; and one unfortunate man, who with a party was trying to catch one alive, lost two of his fingers, besides being severely bitten on the face, while the animal finally beat off his pursuers and escaped.

“The rude hut which they are stated to build in the trees would be more properly called a seat or nest, for it has no roof or cover of any sort. The facility with which they form this seat is curious ; and I had an opportunity of seeing a wounded female weave the branches together, and seat herself in a minute. She afterward received our fire without moving, and expired in her lofty abode, whence it cost us much trouble to dislodge her.

“The pappan is justly named *Satyrs*, from its ugly face and disgusting callosities. The adult male I killed was seated lazily on a tree. His proportions were enormous relative to his height ; he was nearly six feet in stature.

“The great difference between the *kassar* and the pappan in size would prove the distinctness of the two species ; the *kassar* being a small, slight animal, by no means formidable in his appearance, with hands and feet proportioned to the body, and they do not approach the gigantic extremities of the pappan either in size or power ; and a moderately strong man would readily overpower one, when he would not stand a shadow of a chance with the pappan.”

I once saw a young orang-outang. It was rather spidery in its development, having a very small and very rotund body, to

which were affixed very long and slender limbs. Its face was like that of a very misanthropical old miser, thoroughly wearied of life, and contemplating surrounding objects with a calm but derisive pity. It possessed in a high degree the expressive mobile character of the lips, which appeared to denote its feelings much in the same manner as do the ears of a horse.

When young, the orang-outang is very docile, and has been taught to make its own bed, and to handle a cup and saucer or a spoon with tolerable propriety. For the former occupation it proved itself particularly apt, as it not only laid its own bed-clothes smooth and comfortable, but exhibited much ingenuity in stealing blankets from other beds, which it added to its own. A young orang evinced extreme horror at the sight of a small tortoise, and, when the reptile was introduced into its den, stood aghast in a most ludicrously terrified attitude, with its eyes intently fixed on the frightful object.

The AGILE GIBBON is a native of Sumatra. It derives its name of Agile from the wonderful activity it displays in launching itself through the air from branch to branch. One of these creatures sprang with the greatest ease through distances of twelve and eighteen feet, and when apples or nuts were thrown to her while in the air, she would catch them without discontinuing her course. She kept up a succession of springs, hardly touching the branches in her progress, continually uttering a musical but almost deafening cry. She was very tame and gentle, and would permit herself to be touched or caressed. The height of the gibbon is about three feet, and the reach of the extended arms about six feet. The young gibbon is usually of a paler color than its parent.

The KAHAU is a native of Borneo. It derives its name from the cry it utters, which is a repetition of the word "Kahau." It is remarkable for the extraordinary size and shape of its nose, and

while leaping it holds that organ with its paws, apparently to guard it against the branches. Its length from the head to the tip of the tail is about four feet ; and its general color is a sandy red, relieved by yellow cheeks and a yellow stripe over the shoulders.



THE BABOON MOTHER AND HER INFANT.

BABOONS are distinguished from the apes by their short and insignificant-looking tails. The MANDRILL is the most conspicuous of the baboon tribe, is a native of Guinea and Western Africa, and is chiefly remarkable for the vivid colors with which it is adorned.

Its cheeks are of a brilliant blue, its muzzle of a bright scarlet, and a stripe of crimson runs along the centre of its nose. These colors are agreeably contrasted by the purple hues of the hinder quarters.

It lives principally in forests filled with brushwood, from which it makes incursions into the nearest villages, plundering them with impunity. On this account it is much dreaded by the natives, who feel themselves incapable of resisting its attacks. It is excessively ferocious, and easily excited to anger, and when enraged, so boundless is its rage, that Cuvier relates that he has seen several of these animals actually expire from the violence of their fury. The greenish-brown color of the hair of this and other monkeys is caused by alternate bands of yellow and black which exists on each hair. The brilliant colors referred to above belong to the skin, and fade away entirely after death, becoming paler when the animal is not in perfect health.

The AMERICAN MONKEYS, or Cebidæ, are found exclusively in South America and are never seen north of Panama. Their tails are invariably long, and, in some genera, prehensile.

The Coaita is one of the SPIDER MONKEYS, so called from their long, slender limbs, and their method of progressing among the branches. The tail seems to answer the purpose of a fifth hand, as it is capable of being used for every purpose to which the hand could be applied; indeed, the Spider Monkeys are said to use this member for hooking out objects where a hand could not be inserted. The tail is also of considerable use in climbing among the branches of trees; they coil it round the boughs to lower or raise themselves, and often will suspend themselves entirely by it, and then by a more powerful impetus swing off to some distant branch. The habits of all the Spider Monkeys are very similar. They are extremely sensitive to cold, and when chilly are in the habit of wrapping their tail about them, so that this useful organ answers

the purpose of a boa as well as a hand. They will also, when shot, fasten their tail so firmly on the branches that they remain suspended after death. The great length of their tails enables them to walk in the erect attitude better than most monkeys. In walking, they cast their tails upward as high as the shoulders, and then bend it over so as to form a counter-balance against the weight of the body, which is thrown very much forward in that and most other monkeys. The genus is called *Ateles*, or imperfect, because in most of the species the thumb is wanting. The *Coaita* inhabits Surinam and Guinea.

The *HOWLING MONKEYS* are larger and not so agile as the Spider Monkeys. These animals possess an enlargement in the throat, composed of several valvular pouches, which apparatus renders their cry exceedingly loud and mournful, from which peculiarity they derive their name. They howl in concert, principally at the rising and setting of the sun. They are in great request among the natives as articles of food, their slow habits rendering them an easy prey.

The *URSINE HOWLER* or *Araguato*, is common in Brazil, where forty or fifty have been observed on one tree. They generally travel in files, an old monkey taking the lead, and the others following in due order. They feed principally on leaves and fruit; the tail is prehensile like that of the Spider Monkeys.

The *MARMOSET* is a most interesting little creature. It is exceedingly sensitive to cold, and when in America is usually occupied in nestling among the materials for its bed, which it heaps up in one corner, and out of which it seldom emerges entirely.

It will eat almost any article of food, but is especially fond of insects, which it dispatches in a very adroit manner. It will also eat fruits, especially those of its native country.

The LEMURS derive their name from their nocturnal habits and their noiseless movements. The Ruffled Lemur is a native of Madagascar. It lives in the depths of the forests, and only moves by night, the entire day being spent in sleep. Its food consists of fruits, insects, and small birds, which latter it takes while they are sleeping. This is the largest of the lemurs, being rather larger than a cat.

The SLENDER LORIS is a native of India, Ceylon, etc. It, like the lemur, seldom moves by day, but prowls about at night in search of food. No sooner does it espy a sleeping bird than it slowly advances until within reach, then putting forward its paw with a motion slow and imperceptible as the movement of the shadow on the dial, it gradually places its fingers over the devoted bird; then, with a movement swifter than the eye can follow, it seizes its startled prey.

### BATS, OR WING-HANDED ANIMALS.

This name is derived from the singular manner in which their forepaws, or hands, are developed into wings. If the fingers of a man were to be drawn out like wire to about four feet in length, a thin membrane to extend from finger to finger, and another membrane to fall from the little finger to the ankles, he would make a very tolerable imitation of a bat.

The usual food of bats is insects, which they mostly capture on the wing, but some, as the Vampires, suck blood from other animals, and a few, as the Kalong, or Flying Fox, live upon fruits, and so devastate the mango crops, that the natives are forced to cover them with bamboo baskets, to preserve them from the ravages of these animals, who would soon strip the fruit trees without these precautions. Even the cocoa-nut is not secure from their depredations.

The membrane of the bat's wing is plentifully supplied with nerves, and is extremely sensitive, almost appearing to supply a sense independent of sight. Many bats possess a similar membrane on the nose, which is possibly used for the same purpose.

The object of the elongation of the finger joints is to give the animal the power of extending the wing membrane or folding it at



VAMPIRE BAT.

pleasure. When the bat wishes to walk, it half folds the membrane, and assumes an attitude admirably represented in pictures of the Long-eared Bat. The thumb-joint has no part of the wing attached to it, but is left free, and is armed with a hook at the extremity, by means of which it is enabled to drag itself along in that singular vacillating hobble which constitutes a bat's walk.

There are five tribes, or sub-families, of bats, according to

Gray, each tribe including many genera. The Vampire Bat is a native of South America, where it is very common, and held in some dread. It lives on the blood of animals, and sucks usually while its victim sleeps. The extremities, where the blood flows freely, as the toe of a man, the ears of a horse, or the combs and wattles of fowls, are its favorite spots. When it has selected a subject, on which it intends to feed, it watches until the animal is fairly asleep. It then carefully fans its victim with its wings while it bites a little hole in the ear or shoulder. The wound is so small, and the bat manages so adroitly, that the victim does not discover that anything has happened until the morning, when a pool of blood betrays the visit of the vampire.

There have been very different accounts of the vampires from travellers, some denying that they suck the blood at all, and others narrating circumstantially the injuries inflicted upon their own persons.

The LONG-EARED BAT is found in most parts of Europe, and is common in England. It may be seen any warm evening flying about in search of insects, and uttering its peculiar shrill cry. The ears are about an inch and a half in length, and have a fold in them reaching almost to the lips. This bat is very easily tamed, and will take flies and other insects from the hand. When the long-eared bat is suspended by its hinder claws, it assumes a most singular aspect. The beautiful long ears are tucked under its wings, which envelop a great part of its body. The tragus, or pointed membrane visible inside the ear, is then exposed, and appears to be the actual ear itself, giving the creature a totally different cast of character.

## QUADRUPEDS.

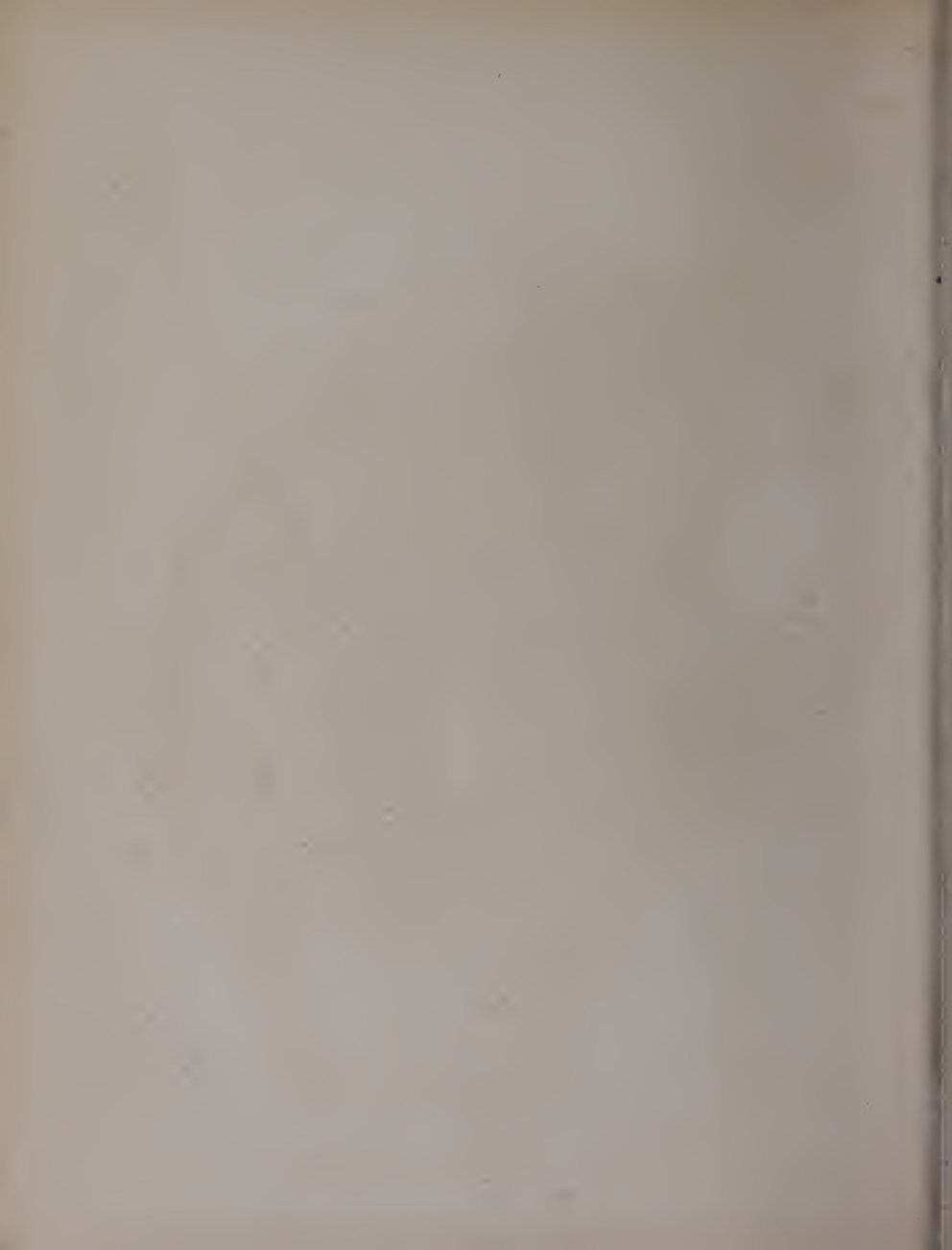
The former sections have been characterized by the number and properties of the *hands*. In this section the hands have been modified into feet. At the head of the quadrupeds, or four-footed animals, are placed, the *carnivora*, or flesh-eaters, and at the head of the *carnivora*, the *Felidæ*, or cat kind, are placed, as being the most perfect and beautiful in that section. The *Felidæ* all take their prey by creeping as near as they can without observation, and then springing upon their unfortunate victim, which seldom succeeds in making its escape, as the powerful claws and teeth of its enemy usually dash it insensible to the ground. The jaws and teeth of the *Felidæ* are powerful, and their teeth long and sharp. Their claws are necessarily very long, curved, and sharp, and to prevent them from being injured by coming in contact with the ground, they are retracted, when not in use, into a sheath, which effectually guards them and keeps them sharp. There are five claws on the fore-feet, and four on the hinder feet.

The tongue is very rough, as may be proved by feeling the tongue of a cat. The roughness is occasioned by innumerable little hooks which cover the tongue, point backward, and are used for the purpose of licking the flesh off the bones of their prey. The bristles of the mouth, or whiskers, are each connected with a large nerve, and are exceedingly useful in indicating an obstacle when the animal prowls by night. Their eyes are adapted for nocturnal vision by the dilating power of the pupil, which expands so as to take in every ray of light.

The *LION* stands at the head of the wild beasts. His noble and dignified bearing, the terrific power compressed into his comparatively small frame, and the deep majesty of his voice, have gained for him the name of "king of beasts." The lion inhabits Africa and certain parts of Asia, such as Arabia and Persia and



THE BEAR.



some parts of India. It varies in external appearance according to the locality, but there is little doubt that there is but one species.



THE LION.

The roar of the lion is one of its chief peculiarities. The best description of it is in Gordon Cumming's Adventures :

"One of the most striking things connected with the lion is his voice, which is extremely grand and peculiarly striking. It consists, at times, of a low, deep moaning, repeated five or six times, ending in faintly audible sighs; at other times he startles the forest with loud, deep-toned, solemn roars, repeated five or six times in quick succession, each increasing in loudness to the third or fourth, when his voice dies away in five or six low, muffled sounds, very much resembling distant thunder. At times, and not unfrequently, a troop may be heard roaring in concert, one assuming the lead, and two, three, or four more regularly taking up their parts like persons singing a catch."

"As a general rule lions roar during the night, their sighing moans commencing as the shades of evening envelop the forest, and continuing at intervals throughout the night. In distant and secluded regions, however, I have constantly heard them roaring loudly as late as nine or ten o'clock on a bright, sunny morning. In hazy or rainy weather they are to be heard at every hour in the day, but their roar is subdued."

The opinion that lions will not touch a dead animal is erroneous, as they were frequently shot by Mr. Cummings while devouring gnoos, etc., that had fallen by his rifle. Those lions who have once tasted human flesh are generally the most to be dreaded, as they will even venture to spring in among a company of men, and seize their victim. These lions are called Man-eaters.

The Lioness is much smaller than the lion, and is destitute of the magnificent mane which is so great an ornament to her mate. As a general rule she is more fierce and active than the male, especially before she has had cubs, or while she is suckling them. She has usually from two to four cubs at a time. They are beautiful, playful little things, and are slightly striped. They have no mane until about two years old. While her cubs are small, the

lioness knows no fear, and will attack a company of men, or a herd of oxen, if they come too near her den. The cubs are remarkably heavy for their age.

The lion when young is easily tamed, and shows a strong attachment to its keeper. Those who have seen lion tamers will know what influence man may obtain over this powerful creature. There is one remarkable difference in the characters of the feline and canine tribes. If a man is overcome by a wolf or a dog, the animal ceases not to mangle its vanquished foe until life is quite extinct. A dog killing a rat is a good instance of this trait of character.

But if a lion or any other feline animal vanquishes a man, it contents itself with the victory for some time without making any attempt to injure him, unless he tries to escape, in which case he is again dashed to the earth, and probably considerably bitten as a warning.

At the extremity of the lion's tail there is a small hook or claw, which has been represented as the means by which the animal lashes itself into fury, using it as a spur. This is impossible, as the claw or prickle is very small, not fixed to the bone as the claws of the feet are, but merely attached to the skin, and falls off if roughly handled. It is not present in all lions, as Mr. Wood only discovered it once out of numerous specimens which he examined.

The TIGER is found only in Asia, Hindostan being the part most infested by it. In size it is almost equal to the lion, its height being from three to four feet, and its length rather more than eight feet. It has no mane, but it is decorated with black stripes, upon a ground of reddish yellow fur, which becomes almost white on the under parts of the body. The chase of the tiger is among the most exciting and favorite sports in India. A number of hunters assemble, mounted on elephants trained to the sport, and carry with them



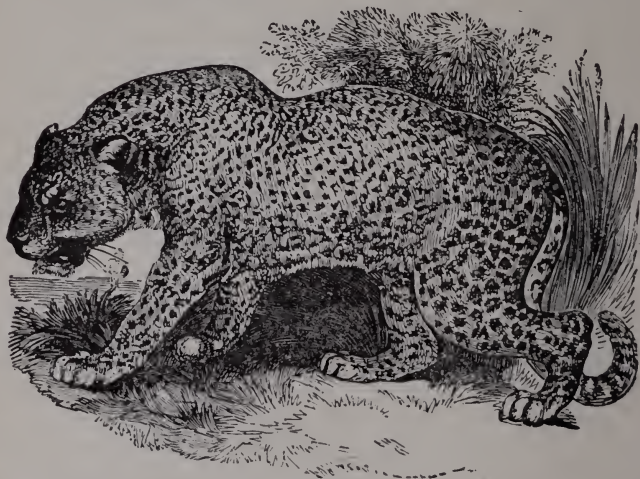
THE TIGER.

a supply of loaded rifles in their howdahs, or carriages mounted on the elephants' backs. Thus armed, they proceed to the spot where a tiger has been seen. The animal is usually found hidden in the long grass or jungle, which is frequently eight or more feet in height, and when roused, it endeavors to creep away under the grass. The movement of the leaves betrays him, and he is checked by a rifle ball aimed at him through the jungle. Finding that he cannot escape without being seen, he turns round and springs at the nearest elephant, endeavoring to clamber up it, and attack the party in the howdah. This is the most dangerous part of the proceedings, as many elephants will turn round and run away, regardless of the efforts of their drivers to make them face the tiger. Should, however, the elephant stand firm, a well-directed ball checks the tiger in his spring, and he then endeavors to again escape, but a volley of rifle-balls from the backs of the other elephants, who by this time have come up, lays the savage animal prostrate, and in a very short time his skin decorates the successful marksman's howdah.

Tigers are usually taken by the natives in pitfalls, at the bottom of which is planted a bamboo stake, the top of which is sharpened into a point. The animal falls on the point, and is impaled. The notion that tigers cannot be tamed is erroneous. They can be tamed as easily as the lion. The coloring of the tiger is a good instance of the manner in which animals are protected by the similarity of their external appearance to the particular locality in which they reside. The stripes on the tiger's skin so exactly assimilate with the long jungle grass among which it lives, that it is impossible for unpractised eyes to discern the animal at all, even when a considerable portion of its body is exposed.

The LEOPARD is an inhabitant of Africa, India, and the Indian Islands. A black variety inhabits Java, and is not uncommon there. Its height is about two feet. This and the following *Felidæ*

are accustomed to live much on trees, and are on that account called tree-tigers by the natives. Nothing can be more beautiful than the elegant and active manner in which leopards sport among the branches of the trees: at one time they will bound from branch to branch with such rapidity, that the eye can scarcely follow them; then, as if tired, they will suddenly stretch themselves along a branch, so as to be hardly distinguishable from the bark, but start



THE LEOPARD.

up again on the slightest provocation, and again resume their graceful antics. It is easily tamed, and expresses great fondness for its keeper, and will play with him like a cat. This animal is exceedingly fond of some scents, especially preferring lavender water, by means of which predilection it has been taught to perform several tricks. The Leopard and Panther are considered as the same animal.

The JAGUAR inhabits America. It is larger and more powerful than the leopard, which it resembles in color, but has a black streak across the chest, and a black spot in the centre of the rosettes. It is fond of climbing trees, and finds little difficulty in ascending, even when the trunk is smooth and destitute of branches. It chases monkeys successfully, and is said to watch for turtles on the beach, and to scoop out their flesh by turning them on their backs and inserting its paws between the shells. Nor does it confine its attention to the turtles themselves, for it watches them lay their eggs, and then scoops them out of the sand with its claws. It often makes fearful havoc among the sheep-folds, and is said to depart so far from the usual habits of the Felidæ, as to enter the water after fish, and to capture them in the shallows by striking them out of the water with a blow of its paw.

The PUMA, or Mountain Lion, inhabits the whole of America, where it is held in much dread by the natives. Its color is a uniform gray, fading into white on the under parts of its body, and this similarity of color is the reason that the name "concolor" has been given to it. It lives much on trees, and usually lies along the branches, where its uniform dusky fur renders it so like the bark that it can scarcely be distinguished from the branch. Americans always speak of this animal as the panther, or "painter," as it is more familiarly pronounced; and many authors still term it the *cougar*, a word contracted from the original elongated unpronounceable Mexican name, "Gouazouara."

The OCELOT, one of the Tiger-cats, is a native of Mexico and Peru. Its height is about eighteen inches, and its length about three feet. It is a beautiful animal, and is easily tamed. When in a wild state it lives principally on monkeys, which it takes by stratagem.

The domestic CAT was formerly supposed to be the same ani-



MANX CAT. ANGORA CAT.

mal as the wild cat, but it is now proved to be a distinct species, and the difference is seen at once by the form of the tail. That of the domestic cat is long and taper, while that of the wild cat is bushy and short.

The cat is familiarly known to us as a persevering mouse-hunter. So strong indeed is the passion for hunting in the breast of the cat, that she sometimes disdains mice and trespasses on warrens or preserves.

This instinctive desire of hunting seems to be implanted in cats at a very early age. I have seen kittens but just able to see bristle up at the touch of a mouse, and growl in a terrific manner if disturbed.

The cat displays a great affection for her kittens, and her pride when they first run about is quite amusing. While I was undergraduate at college, a cat belonging to the baker's department formed a great friendship for me, and used to come every morning and evening to obtain her share of breakfast and tea. She continued her attention for some time, but one morning she was absent from her accustomed corner, nor did she return until nearly a week had passed, when she came again, but always seemed uneasy unless the door was open. A few days afterward she came up as usual, and jumped on my knee, at the same time putting a little kitten in my hand. She refused to take it back again, so I restored it to its brothers and sisters myself. A few hours afterward, on going into my bedroom, I found another black kitten fast asleep on the bed.

The LYNXES are remarkable for the pencil of hairs which tufts their sharply pointed ears. The CANADA LYNX is a native of North America, and is remarkable for its gait. Its methods of progression is by bounds from all four feet at once, with the back arched. It feeds principally on the American hare, as it is not courageous

enough to attack the larger quadrupeds. Its length is about three feet. The Indians sometimes eat its flesh, which is white and firm, and not unlike that of the American hare itself. Its skin forms an important article of commerce.

The CHETAH, or HUNTING LEOPARD, as it is sometimes called,



EUROPEAN LYNX.

is one of the most elegant and graceful animals known. It is a native both of Africa and India, but it is only in the latter country that it is used for hunting game.

The method of employing it is usually as follows: The chetah is placed in a cart, and taken as near as possible to the place where antelopes or deer are feeding. When close enough, the hunter takes

the band from its eyes, and directs its head toward the game. Directly the chetah sees the deer, it creeps off the cart, and makes toward them as rapidly and silently as it can, carefully availing itself of the cover of a bush, or stone, precisely as a cat does when stealing after a bird. When it has succeeded in unobservedly approaching the unsuspecting herd, it makes two or three tremendous springs, and fastens on the back of one unfortunate deer, brings it to the ground, and waits until its keeper comes up, who induces it to leave its prey by a ladleful of the blood, which he takes care to have ready. The chetah is then hooded and led back to his cart. It is so easily tamable and so gentle that it is frequently led about the streets by a string for sale.

It is rather larger than the leopard, and differs from it in the length of its paws, its inability to climb trees, and the crispness of its fur. It is therefore placed in a different genus from the leopard.

The HYENAS are remarkable for their predatory, ferocious, and withal cowardly habits. There are several hyenas, the striped, the spotted, and the villose, but as the habits of all are very similar, only one will be mentioned. The hyenas, although very repulsive in appearance, are yet very useful, as they prowl in search of dead animals, especially of the larger kinds, and will devour them even when putrid, so that they act the same part among beasts that the vultures do among birds, and are equally uninviting in aspect. They not unfrequently dig up recently interred corpses, and in Abyssinia they even flock in numbers into the village streets, where they prey on slaughtered men who are thrown out unburied. Their jaws and teeth are exceedingly powerful, as they can crush the thigh-bone of an ox with apparently little effort; and so great is the strain upon the bones by the exertions of these muscles, that the vertebræ of the neck become ankylosed, as it is called, that is, become united together, and the animal has a perpetual stiff neck in conse-

quence. The skull too is very strong, and furnished with heavy ridges for the support of the muscles which move the jaw.

The hinder parts of the hyena are very small, and give a strange shambling appearance when walking. The hyena is easily tamed, and even domesticated, so that the tales of its untamable disposition are entirely erroneous.

The striped hyena is found in many parts of Asia and Africa, where it is both a benefit and a pest, for when dead animals fail it, the flocks and herds are ravaged, and even man does not always escape.

The CIVETS are active little animals, averaging about two feet in length. The whole group is celebrated for the perfume which is secreted in a glandular pouch near the tail, and is of some importance in commerce. The civet is only found in North Africa, especially in Abyssinia, where it takes up its abode on uncultivated and barren hills. It feeds upon birds and smaller quadrupeds, which it takes by surprise.

The ICHNEUMONS, or MANGOUSTS, well deserve their name of Creepers, for with their long bodies and snouts, their short limbs and slender tails, they insinuate themselves into every crevice in their way in search of their expected food. Few animals are more useful than the ichneumons. Snakes, lizards, crocodiles' eggs, or even young crocodiles themselves, form their principal food, and their activity is so great that, when these sources fail, they are able to secure birds, and even seize upon the swift and wary lizards, which, when alarmed, dart off like streaks of green light glancing through the bushes.

The Egyptian Ichneumon, or Pharaoh's Rat, as it is sometimes called, is a native of North Africa, and is often domesticated for the purpose of destroying the various snakes, and other reptile annoyances, which are such a pest in the houses of hot countries. Its length without the tail is about eighteen inches.



SPOTTED HYENA.

We now arrive at the Dog Family, which includes the Dogs, Wolves, Jackals, and Foxes. The first of the Dogs is the KOLSUN, or DHALE, which inhabits Bombay and Nepaul. It hunts in packs, as most of the dogs do even in a wild state, and has been known to destroy tigers and chetahs. Let us pass to a more interesting animal, the NEWFOUNDLAND DOG.

This magnificent creature was originally brought from Newfoundland. It is often confounded with the LABRADOR DOG, a larger and more powerful animal. Both these dogs are trained by their native masters to draw sledges and little carriages, and on that account are highly esteemed.

The Newfoundland dog is well known as a most faithful guardian of its master's property. It is very fond of the water, and will fetch out any article that its master indicates, and lay it at his feet. Many instances are known of this noble animal saving the lives of people that had fallen into the water, and must have perished but for its timely aid. This is one of the largest of the dogs, as it stands nearly two feet two inches in height.

THE BLOODHOUND.—There are several varieties of this animal, inhabiting Cuba, Africa, England, and America. They are all endowed with a wonderfully acute sense of smell, and can trace a man or animal with almost unerring certainty. The Cuban bloodhound was formerly employed by the Spaniards to hunt down the natives while endeavoring to escape from their invasions. A few years since, one of these dogs saved the life of its master, an American hunter, by boldly attacking a puma which had sprung on him in the darkness, and was lacerating him in a dreadful manner. The sagacious animal had been tied up at home, but apparently knowing the dangers of the forests through which its master was about to pass, he broke his chain, and arrived barely in time to save the hunter from a horrible death.



GROUP OF DOGS.

The *FOXHOUND* and *BEAGLE* are not very dissimilar in form or habits. They both follow game by the scent, and are used in hunting. The foxhound, as its name implies, is used for hunting the fox, and enters into the sport with extraordinary eagerness. The height of the foxhound is about twenty-two inches.

The beagle is used principally for hare hunting. It is much smaller than the foxhound, and not nearly so swift, but its scent is so perfect that it follows every track of the flying hare, unravels all her windings, and seldom fails to secure her at last. Sportsmen usually prefer the smallest beagles obtainable.

The *POINTER* is used by sportsmen to point out the spot where the game lies. It ranges the fields until it scents the hare or partridge lying close on the ground. It then remains still as if carved in stone, every limb fixed, and the tail pointing straight behind it. In this attitude it remains until the gun is discharged, reloaded, and the sportsman has reached the place where the bird sprang.

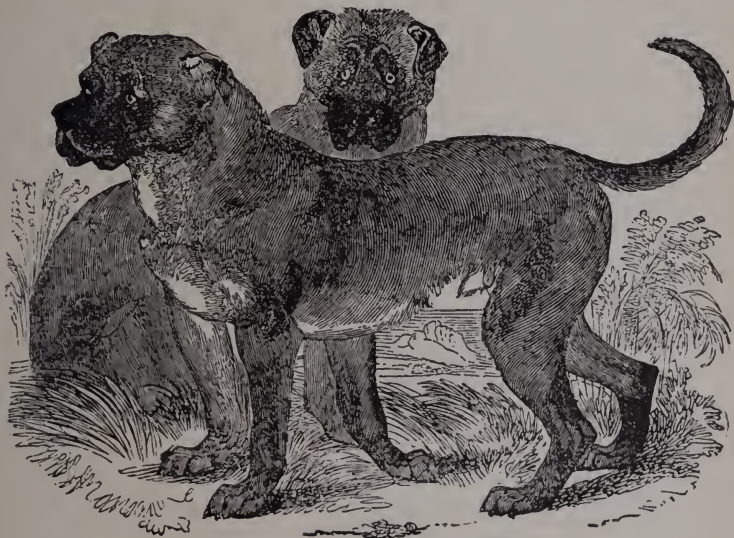
The group of the *MASTIFF* dogs is distinguished by the shortness of the nose and the breadth of the head. This group includes the mastiff, the bull-dog, and the absurd little pug-dog. The breadth of their heads is caused by the large muscles which move the jaw.

The English mastiff is generally employed as a house-dog, as its powerful frame and deep voice are well fitted to scare away marauders, or to repel them if they approach too near. It is by far the most sagacious of the whole group, and exhibits much more attachment to its master than the others.

The *BULL-DOG* is proverbial for courage and endurance. Unfortunately its social qualities are by no means pleasing, as, although it has some attachment to its master, yet it is not always safe for him to disturb it. This dog was extensively used in the cruel sport

of bull-baiting, a recreation now extinct. When opposed to the bull, the dog would fly at its nose, and there hang in spite of all the infuriated animal's struggles.

The TERRIERS never grow to any considerable size. There are several breeds of terriers, among which the English and Scotch are most conspicuous. These dogs are principally used for destroying



THE CUBAN MASTIFF.

rats or other vermin, and are so courageous that they do not hesitate to unearth the fox or badger. Otters are also hunted by them, but prove by no means an easy prey. Terriers are extremely attached to their master, and are capable of learning many amusing tricks.

The SHEPHERD'S DOG is a rough, shaggy animal, with sharp pointed ears and nose. It is an invaluable assistant to the shepherd,

as it knows all its master's sheep, never suffers them to stray, and when two flocks have mixed, it will separate its own charge with the greatest certainty. It understands every look and gesture of its beloved master, and drives the flock to any place which he points out.

The GREYHOUND is the swiftest of all the dogs, and is principally used in the pursuit of the hare. It has but little delicacy in scent, and hunts almost entirely by sight. The hare endeavors to baffle it by making sharp turns, which the dog cannot do on account of its superior size, and has therefore to take a circuit, during which the hare makes off in another direction. The hare also has the property of stopping almost instantaneously when at full speed. It puts this manœuvre into force, when it is nearing its favorite hiding-place. It induces the dog to spring upon it, and then suddenly checks itself. The dog is carried twenty or thirty yards away by its own momentum, and the hare springs off to her place of refuge.

PRAIRIE DOG.—The title of Prairie Dog has been given to this animal on account of the sharp yelping sound which it is in the habit of uttering, and which has some resemblance to the barking of a very small and very peevish lap-dog. Every time it yelps it gives its tail a smart jerk. This peculiar sound is evidently employed as a cry of alarm; for as soon as it is uttered all the prairie dogs dive into their burrows, and do not emerge again until they hear the shrill whistle which tells them that the danger is past.

WOLF.—The wolf looks much like a large shaggy dog, and it has been thought by many that the first dogs sprang from wolves. When taken young the wolf may be tamed, and it shows as much love for its master as the dog does. The wolf is very swift, and hunts deer and other animals in packs. It is sly and stealthy, and often prowls about lonely farms, to catch stray sheep, calves, pigs, or fowls, but is also cowardly and is easily frightened off by the barking of a dog or the sound of a gun.



THE WOLF.

When pressed by hunger it becomes dangerous, and will attack horses and oxen, and even men. In hard winters packs of hungry wolves come down from the forests of the Alps and other mountains in Europe and commit great ravages; and many terrible stories have been told of travellers who have been chased by them in great forests, especially in Russia and Siberia. It is said that in Russia more than two hundred human beings are killed by wolves every year, and a great many thousands of cattle and sheep.

The GREY WOLF of North America is usually gray above and yellowish gray below, but is sometimes nearly white. It is three or four feet long, with a tail about a foot and a half long.

Packs of these wolves follow the buffalo herds on the western plains, feeding on the sick and straggling ones. They also attack horses, and sometimes men, when very hungry. They were once plentiful in New England and the other Eastern States, but now only a few are found in mountainous and thickly wooded parts.

In 1739 Israel Putnam, who afterward became so well known as General Putnam of the Revolutionary War, began life as a farmer in the town of Pomfret, Connecticut, forty miles east of Hartford. That part of the State was then quite wild, and the wolves were so troublesome that they killed seventy of his sheep in one night. The mischief was all done by one old she wolf and her cubs, who had lived in the woods near there for several years. The hunters killed the cubs, but the old one was too wary to be caught. She was at last driven by bloodhounds into a den about three miles from Putnam's house. The hunters tried to smoke her out by burning straw and brimstone in the mouth of the cave, but the wolf would not come out, and Putnam, tired of waiting any longer, for it was then ten o'clock at night, took a blazing torch in his hand and went down the hole, which was only high enough for him to crawl on his hands and knees. He had a rope tied round

his legs, and told his friends to pull him up when he gave a signal. He crawled along more than thirty feet, or six times a man's length, without seeing anything; but all at once he saw at the end of the cave the glaring eyeballs of the wolf. She gnashed her teeth and gave a sudden growl, and his friends, who heard it, pulled him out so quickly that his shirt was torn to strips and his skin badly cut. He then loaded his gun with buckshot, and taking it in one hand and a torch in the other, went down again. As soon as he came near the wolf, she growled and made ready to spring at him, but he shot her quickly in the head, and was hauled out again nearly deaf with the noise, and choked with the smoke. After the smoke had cleared away, he crawled down a third time, took the dead wolf by the ears, and the two were pulled out by the people above with much joy.

The Indians catch many grey wolves in traps, and also kill many by surrounding them in a circle, which they make smaller, little by little, until they get near enough to shoot them.

The PRAIRIE WOLF, which the Mexicans call *coyote*, is smaller than the grey wolf, and is much like a jackal. The true wolf has a howl like that of a dog, but the prairie wolf has only a kind of snapping bark, whence it is sometimes called the barking wolf. It lives in burrows on the great Western plains, is very swift, and hunts in packs.

THE FOX.—This terror of hen-roosts and delight of sportsmen is found in most parts of America, and many other countries. It varies very much in color and size, according to the country where it lives.

The habits of this animal are mostly nocturnal. It lies by day concealed in its burrow, if it be fortunate enough to possess one. Toward evening it sallies out in search of food, and woe to the unfortunate hare, rabbit, pheasant, or fowl that comes in its way.

Sometimes he steals into the hen-roost, destroys and carries off most of its inmates, some of which he devours on the spot, others he carries home, and the remainder he buries for a future repast.

When irritated, the fox gives out a strong, disagreeable scent, which lies so long on the ground that it may be perceived for nearly an hour after the fox has passed. Partly on this account, and partly on account of its speed, endurance, and cunning, the chase of the fox is one of the most admired of English sports.

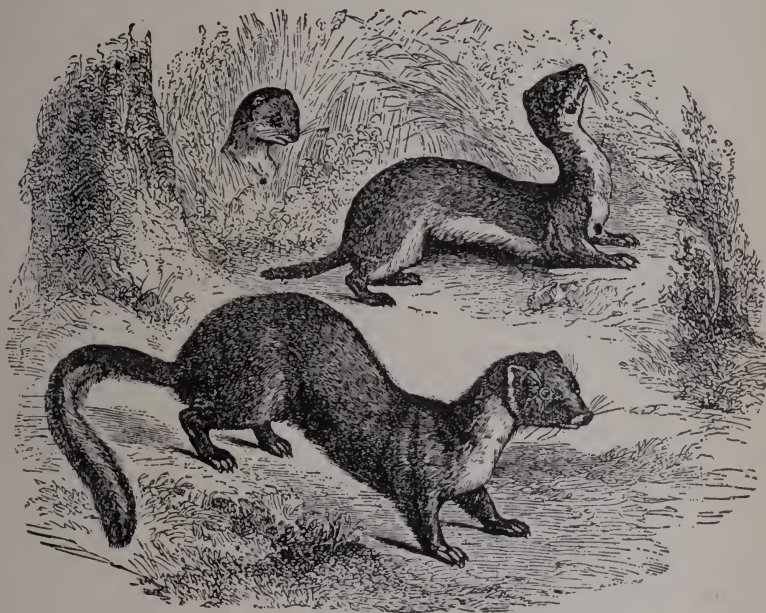


THE FOX.

The WEASELS are easily distinguished by their long slender bodies, short muzzle, sharp teeth, and predatory habits. They inhabit almost every part of the world, and procure their food by creeping on their unsuspecting victim, generally a rabbit, rat, or bird, and then suddenly darting at it and piercing its neck with their sharp teeth. Almost all the weasels devour the brain and suck the blood of their prey, but seldom touch the flesh, unless they are pressed by hunger.

There are two kinds of MARTENS, named, from their favorite

haunts, the Pine and the Beech Marten. Some naturalists assert that these two martens are not distinct animals, but only varieties of the same species. The Pine Marten is common in North America, where it is much too fond of chickens and ducklings to be



THE MARTEN.

THE WEASEL.

a desirable neighbor. This animal, as well as the sable, is much sought after on account of its skin, which furnishes a beautiful fur, not much inferior to that of the sable.

The STOAT, or ERMINE, is smaller than the polecat, but its habits are scarcely less predaceous. Hares and rabbits fall easy

victims to their little enemy, who despatches them with a single bite, penetrating the brain. During the winter the stoat becomes partially white, in northern countries wholly so, except the tip of the tail, which remains black. In this state it is called the ermine, and is killed in great numbers for the sake of its beautiful and valuable fur.

The WEASEL is the least of this tribe. It is exceedingly useful to farmers, as it wages unrelenting war on rats and mice, and in an incredibly short space of time extirpates them from a barn or stack. It hunts by scent like dogs, and tracks the unfortunate rat with the most deadly certainty. It is a most courageous little animal, and will even attack men, who have found it by no means a despicable antagonist, as its instinct invariably leads it to dash at the throat, where a bite from its long, sharp teeth would be very dangerous.

THE BADGER.—This harmless and much injured animal (which is often subjected to such ill treatment that the term "badgering" a person is used to express irritating him in every possible way) lives at the bottom of deep burrows, which it excavates, and in which it passes all the day sleeping on a very comfortable bed of hay and grass. When the evening approaches it seeks its food, consisting of roots, fruit, insects, and sometimes young rabbits. It is also said to attack the wild bee, and boldly devour the honey and combs, its thick hair and skin rendering it utterly regardless of the stings of the enraged bees.

The power of the badger's bite is caused principally by the manner in which the under jaw is set on. Not only are its teeth sharp, and the leverage of its jaw powerful, but the jaw is so contrived that, when the creature closes its mouth, the jaw locks together as it were, and is held fast without much exertion on the part of the badger. Its skin is rather valuable, the hair being

extensively employed in the manufacture of brushes, and its fur being in some request for holsters. The length of the badger is about two feet three inches.

The OTTER seems to play the same part in the water as the polecat and other weasels on the land. Like the polecat, it is excessively rapacious, and destroys many more creatures than it can devour; and as the polecat only eats the brain and sucks the blood, so the other daintily eats the flakes at the back' of the fish's neck, and leaves the rest for less fastidious animals.

It is extremely interesting to watch the actions of this almost amphibious creature. It slides noiselessly into the water, turns and twists about below the surface with the same or greater ease than a fish, then with a graceful sweep of the body it glides to the surface and ascends the bank with almost the same motion. While below the surface it bears a great resemblance to the seal, the method in which it disposes its hind feet greatly assisting the effect. Its rapid and easy movements in the water are mostly performed by the assistance of its powerful tapering tail.

The otter is easily tamed, and its predatory habits have been occasionally turned to account, as it is sometimes trained to catch fish and bring them to shore. The Hindoos have brought the art of otter training to great perfection, and keep their otters regularly tethered with ropes and straw collars on the banks of the river.

The BEARS and their allies are mostly heavy, and walk with the whole foot placed flat on the ground, unlike the cats, dogs, etc., who walk with merely their paws or toes. All the bears are omnivorous—that is, they can eat either animal or vegetable food, so that a leg of mutton, a pot of honey, a potato, or an apple, are equally acceptable.

The BROWN BEAR inhabits the north of Europe, Switzerland, and the Pyrenees.

In olden times the bear used to be baited—that is to say, the bear was tied to a pole, and several dogs were set at him, the object being to see whether the bear could bite the dogs, or the dogs bite the bear with greater force; but this cruel sport is now happily extinct.

The GRIZZLY BEAR, a native of North America, is the most ferocious and powerful of its family, and is an animal which must either be avoided or fought, for there is no medium. If a grizzly once sees a man, it will probably chase him, and will do so with great perseverance. An American traveller told me lately that he had been chased nearly thirty miles by one of these bears, who would probably have kept up the chase as many miles more, had not my informant crossed a wide river, over which the bear did not choose to follow him.

The grizzly bear is very marvellously tenacious of life. Sometimes, it is said, after a party of hunters have been combating one of these bears, it is impossible to find four square inches of sound skin in the animal's body, a ball through the brain or heart affording the only means of safety to the hunter. It is rather singular that this bear has the power of moving each claw separately, as we move our fingers. It is able to overcome and carry off the enormous bison, and to dig a pit in which to bury it.

The POLAR or WHITE BEAR, called Nennook by the Esquimaux, lives in the Arctic regions, where it feeds on seals, fish, or even the walrus, but it dares not attack the latter animal openly. It is a formidable antagonist either by land or water, as it dives with great ease, and is able to chase the seal amid the waves. As the seals frequently crawl out of the water upon rocks or fragments of ice, the Polar bear is forced to swim after them; but lest they should observe him he makes his approaches by a succession of dives, and contrives that the last dive brings him directly under the unsuspecting seal, who is immediately grasped and killed.



THE GRIZZLY BEAR.

Richardson states that these bears are often drifted from Greenland to Iceland on fields of ice, and that they find the flocks and herds so very delicious after a long course of seal diet, that the inhabitants are forced to rise in a body and put an end to their depredations. To give this animal, who is constantly running over fields of ice, a firm footing, the soles of its feet are thickly covered with long hair.



THE RACCOON.

The RACCOON is an animal about the size of a large fox, and an inhabitant of Canada and other parts of America. It is said to possess the habit of washing its food before eating it. Its skin is very valuable, and is much sought after by American hunters. The food of the raccoon is principally small animals and insects. Oysters are also a very favorite article of its diet. It bites off the hinge of the oyster, and scrapes out the animal in fragments with its paws.

Like a squirrel when eating a nut, the raccoon usually holds its food between its fore paws pressed together, and sits upon its hind quarters while it eats. Poultry are very favorite objects of its attack, and it is said to be as destructive in a farm-yard as any fox, for it only devours the heads of the murdered fowl. Like the fox, it prowls by night. When taken young it is easily tamed, but very frequently becomes blind soon after its capture. This effect is supposed to be produced by the sensitive state of its eyes, which are only intended to be used by night; but as it is frequently awakened by daylight during its captivity, it suffers so much from the unwonted glare, that its eyes gradually lose their sight.

THE MOLE.—Many ridiculous stories of the mole and its habits may be found in several authors. This animal is said to be deprived of eyes, to undergo unheard-of tortures in forcing its way through the earth, and to spend a life of misery in subterranean damp and darkness. But so far from being a miserable animal, the mole seems to enjoy its life quite as much as any other creature. It is beautifully fitted for the station which it fills, and would be unhappy if removed from its accustomed damp and darkness into warmth and light.

The eyes of the mole are very small, in order to prevent them from being injured by the earth through which the animal makes its way; indeed, larger eyes would be useless underground. When, however, the mole requires to use its eyes, it can bring them forward from the mass of fur which conceals and protects them when not in use. The acute ears and delicate sense of smell supply the place of eyes.

Its fur is very fine, soft, capable of turning in any direction, and will not retain a particle of mould. But the most extraordinary part of the mole is the paw or hand with which it digs. The two fore paws are composed of five fingers, armed with sharp, strong

nails, in order to scrape up the earth ; and to prevent the accumulated mould from impeding the mole's progress, the hands are turned outwardly, so as to throw the earth out of its way.

The mole is a most voracious animal, and is incapable of sustaining even a slight fast. Its principal food is the earth-worm, in chase of which it drives its long galleries underground ; but it also will eat insects, bits of meat, and is said sometimes to catch birds,



THE MOLE.

which it takes by surprise, and then rapidly tears to pieces with its powerful claws. This ravenous appetite causes it to suffer from thirst if a supply of water is not at hand. For this reason the mole always makes a tunnel toward a pond or brook, if there is one near. If no water is near, it digs a number of little wells, which receive the rain or dew, and enable it to quench its thirst.

It is a good swimmer, and can pass from bank to bank, or from

the shore to an island, and when the fields are inundated by floods it can save itself by swimming. The construction of the mole's habitation is very singular and interesting. Each mole has its own habitation and hunting ground, and will not permit strangers to trespass upon its preserves, which it guards by its own claws and teeth.

If a strange mole should happen to trespass upon the domains of another, there would be a furious fight, and the conqueror would devour his vanquished foe. Although each mole has its own hunting ground, yet there are mostly high-roads, which connect the different hunting grounds with each other, and which are used by many individuals in common, the only precaution taken being that, if two moles should happen to meet, the weaker immediately retreats into one of the numerous side galleries which open from the high-road, and permits its aristocratical neighbor to pass.

All the passions of the mole seem to be furious. Even its passion for work, *i. e.*, search after its food, has something fierce in it. The animal works desperately for several hours, and then rests for as many more. The country people say that it works at intervals of three hours each. The mode of burrowing by this animal is by rooting up the earth with its snout, and then scooping it away with its fore feet. I have often seen this operation performed. The depth at which this animal works depends almost entirely on the time of year. In the summer, the worms come to the surface, and the mole accordingly follows them, making quite superficial runs, and sometimes only scooping trenches on the surface. But in the winter, when the worms sink deep into the ground, the mole is forced to follow them there, and as it cannot fast above an hour or two, it is forced to work at the comparatively hard and heavy soil, as it did in the light earth nearer the surface.

Moles vary in color, the usual tint being a very deep brown,

almost black, but they have been seen of an orange color, and a white variety is not uncommon. I have a cream-colored skin in my possession. There are several moles known—the Shrew-Mole, the Changeable Mole, the Cape Mole, and the Star-nosed Mole are the most conspicuous.

THE SHREW-MOUSE.—This pretty little animal is very like the common mouse, but is easily distinguished from it by the length of its nose, which is used for grubbing up the earth in search of earth-worms and insects.

The reader must not imagine that the shrew has any connection with the true mice. It belongs to an entirely different class of animals, its teeth being sharp and pointed, not unlike those of the mole and the hedgehog, whereas those of the mouse are broad and chisel-shaped like the teeth of the rabbit. A peculiar scent is diffused from these animals, which is possibly the reason why the cat will not eat them, although she will readily destroy them.

Many species of shrews are known, inhabiting various countries. There are, besides the common species, the Oared and the Water Shrew, all three inhabiting England. The formation of their hair, as seen under a powerful microscope, is very beautiful, but quite distinct from the hair of the mouse or rat. In the autumn, numbers of these little animals may be seen lying dead, but what causes this destruction is not known.

This is one of the numerous animals that have suffered by false reports, and have been treated with great cruelty on account of those fables. Rustics formerly believed that the poor little harmless creature paralyzed their cattle by running over them, and that the only way to cure the diseased animal was to place a bough of shrew-ash on the injured part. The shrew-ash was made by boring a hole into an ash-tree, and then plugging up in the hole a living shrew-mouse. By the same process of reasoning a shrew cut in half, and

placed on a wound supposed to be caused by its bite, was considered a certain remedy.

The HEDGEHOG is one of the remarkable animals that are guarded with spikes. These are fixed into the skin in a very beautiful and simple manner. When the hedgehog is annoyed it rolls



THE HEDGEHOG.

itself up, and the tightness of the skin causes all its spines to stand firm and erect, bidding defiance to an unprotected hand.

While rolled up, even the dog and fox are baffled by it; but their ingenuity enables them to overcome the difficulty by rolling it along until they push it into a puddle or pool, when the astonished hedgehog immediately unrolls itself to see what is the matter, and

before it can close itself again is seized by its crafty enemy.

The food of the hedgehog consists of insects, snails, frogs, mice, and snakes. Dr. Buckland placed a snake in the same box with the hedgehog. The hedgehog gave the snake a severe bite, and then rolled itself up, this process being repeated until the spine of the snake was broken in several places; it then began at the tail, and ate the snake gradually, as one would eat a radish. It has been known to bore down and eat the roots of the plantain, leaving the leaves and stem untouched. The flesh of the hedgehog is said to be good eating, and the gypsies frequently make it a part of their diet, as do the people in some parts of Europe.

During the winter it lives in a torpid state, in a hole well lined with grass and moss, and when discovered looks like a round mass of leaves, as it has rolled itself among the fallen foliage, which adheres to its spikes. The quill is as it were pinned through the skin, and retained by the head. The curvature is such that when the animal contracts itself, the quills are drawn upright, and form a strong and elastic covering, useful for more purposes than merely defence from foes.

The hedgehog has been known to throw itself boldly from a considerable height, trusting to the elasticity of the spring for breaking its fall. It will be seen that when the spines are upright the shock of the fall would not tend to drive the end of the quill upon the animal, but merely spend its force upon the elasticity of the curved portion.

THE KANGAROO.—In the mole we saw that the power of the body was placed chiefly in the fore legs. We now come to a family which has the principal power placed in the hinder part of the body. In the kangaroos the hind legs are very long and immensely powerful; the fore legs are very small, and used more as hands than for walking; the tail is also very thick and strong, and assists the animal in its leaps.

The Great Kangaroo inhabits Australia. Its singular formation, peculiarly adapted to the country, calls forth a corresponding degree of ingenuity on the part of the natives, who live much on



THE KANGAROO.

its flesh. Its method of progression is by leaps from its long hind legs. Its natural walking position is on all four legs, although it constantly sits up on the hinder legs, or even stands on a tripod

composed of its feet and tail, in order to look out over the tops of the luxuriant grass among which it lives. The leaping movements are required for haste or escape, the length of each leap being about fifteen feet.

Hunting this animal is a very favorite sport. The natives either knock it down with the boomerang, spear it from behind a bush, or unite together and hem in a herd, which soon fall victims to the volleys of clubs, spears, and boomerangs which pour in on all sides. The colonists either shoot it or hunt it with dogs, a pack of which is trained for that purpose.

The "old man," or "boomer," as the colonists call the great kangaroo, invariably leads the dogs a severe chase, always attempting to reach the water and escape by swimming. It is a formidable foe to the dogs when it stands at bay, as it seizes the dog with its fore legs, and either holds him under water until he is drowned, or tears him open with a well-directed kick of its powerful hind feet, which are armed with a very sharp claw. The female kangaroo carries its young in a kind of pouch, from which they emerge when they wish for a little exercise, and leap back again on the slightest alarm. All the kangaroos and the opossums have this pouch.

The length of the great kangaroo is about five feet without the tail, which is about three feet long.

There are many species of kangaroo, the most extraordinary being the Tree Kangaroo, which can hop about on trees, and has curved claws on its fore paws, like those of the sloth, to enable it to hold on the branches.

The OPOSSUM inhabits North America, and is hunted with almost as much perseverance as the raccoon, for the sake of its flesh. When it perceives the hunter, it lies still between the branches, but if disturbed from its hiding-place, it attempts to

escape by dropping among the herbage, and creeping silently away.

Their flesh when cooked is much like roast pig. When attacked the opossum looks very fierce, snarls, growls, and will often bite, but if struck will make believe dead and will not stir if it is hurt; but it will watch slyly and crawl away as soon as its enemy is gone. From this comes our phrase "to play 'possum."

Its food consists of insects, birds, eggs, etc., and it is very destructive among the hen-roosts. The opossum uses its tail for climbing and swinging from branch to branch as the spider monkeys use theirs; but the opossum uses its tail in a manner that the monkeys have never yet been observed to do, that is, making it a support for its young, who sit on its back and twist their tails round their mother's in order to prevent them from falling off. The length of the opossum is about twenty-two inches, and its height about that of an ordinary cat. When disturbed or alarmed, it gives out a very unpleasant odor.

We now arrive at the RODENTIA, or gnawing animals, so called from their habit of gnawing through, or paring away, the substances on which they feed. For this purpose their teeth are admirably formed, and by their teeth it is easy to ascertain a member of the rodents. They have sharp teeth called canine, such as are seen in the lions and in animals which seize and destroy living animals, but in the front of each jaw there are two long, flat teeth, slightly curved, and having a kind of chisel edge for rasping away wood, or other articles.

The constant labor which these teeth undergo would rapidly wear them away. To counteract this loss, the teeth are constantly growing and being pushed forward, so that as fast as the upper part is worn away, the tooth is replenished from below. So continual is this increase, that when an unfortunate rabbit, or other rodent, has lost one of its incisors, the opposite one, meeting

nothing to stop its progress, continually grows, until sometimes the tooth curls upward over the lip, and prevents the wretched animal from eating, until it is gradually starved to death.

The *BROWN RAT*, sometimes called the Norway Rat, is the species usually found in England and America. It was some years since imported into this country, and from its superior size, strength, and ferocity, has completely established itself, and expelled the original Black Rat.

It is at all times difficult to get rid of these dirty, noisy animals, for they soon learn to keep out of the way of traps, and if they are poisoned they revenge their fate by dying behind a wainscot or under a plank of the floor, and make the room uninhabitable.

The *COMMON MOUSE* is so well known that a description of its form and size is needless. It almost rivals the rat in its attacks upon our provisions, and is quite as difficult to extirpate. It brings up its young in a kind of nest, and when a board of long standing is taken up in a room, it is not uncommon to find under it a mouse's nest, composed of rags, string, paper, shavings, and everything that the ingenious little architect can scrape together. It is a round mass looking something like a rag ball very loosely made. When opened, seven or eight little mice will probably be found in the interior—little pink, transparent creatures, three of which could go into a lady's thimble, sprawling about in the most unmeaning manner, apparently greatly distressed at the sudden cold caused by the opening of their nest. A white variety of mouse is tolerably common, and is usually bred in cages. As it is very tame and beautiful, it is in great repute as a pet.

The *HARVEST MOUSE* is much smaller than the ordinary mouse, a half-penny weighing down two of them when placed in a pair of scales. Its nest is raised about a foot and a half from the ground, and supported on two or three straws. It is made of grass, about the size of a cricket ball, and very compact.

The WATER RAT is a native of England and America, and frequents the banks of rivers, brooks, etc. These animals exist in great numbers round Oxford, and I have repeatedly watched them feeding. I never saw them eating fish, nor found fish-bones inside their holes, except when a kingfisher had taken possession; but I have frequently seen them gnawing the green bark from reeds, which they completely strip, leaving the mark of each tooth as they proceed.

THE BEAVER.—North America is the principal country where the beaver is found, but it is also common on the Euphrates, and along some of the larger European rivers, as the Rhone and the Danube.

The houses of the beaver are built of mud, stones, and sticks. They are placed in a stream, and their entrance is always below the surface. As a severe frost would freeze up their doors, it is necessary to make the stream deep enough to prevent the frost from reaching the entrances. This object is attained



THE HARVEST MOUSE.

by building a dam across the river, to keep back the water until it is sufficiently deep for the beaver's purposes.

The dam is built of branches, which the beaver cuts down with



THE BEAVER.

its strong, sharp teeth, and mud and stones worked in among the branches. The beavers throw these branches into the water, and sink them to the bottom by means of stones, and by continually

throwing in fresh supplies a strong embankment is soon made.

As many beavers live together in one society, the formation of a dam does not take very long. By their united efforts they rapidly fell even large trees, by gnawing them round the trunk, and always take care to make them fall toward the water, so that they can transport the logs easily. The mud and stones, used in the embankment, are carried between their chin and forepaws. That the pond may not be too deep, they always leave an opening in the dam to let the water escape when it rises above a certain height. During the severe winter their mud-built houses freeze quite hard, and prevent the wolverine, their greatest enemy, except man, from breaking through and devouring the inmates. Every year the beavers lay a fresh coating of mud upon their houses, so that after the lapse of a few years the walls of the house are several feet in thickness. Many of the houses are built close together, but no two families can communicate with each other, except by diving below the walls and rising inside their neighbors' houses.

When in captivity the beaver soon becomes tame, and will industriously build dams across the corner of the room with brushes, boots, fire-irons, books, or anything it can find. When its edifice is finished, it sits in the centre, apparently satisfied that it has made a beautiful structure to dam up the river—a proof that the ingenuity of the beaver is not caused by reason, but by instinct. The fur of the beaver, like that of many other animals, consists of a fine wool intermixed with long and stiff hairs. The length of the beaver is about three feet and a half.

The COMMON PORCUPINE is found in America, Africa, Tartary, Persia, India, and some parts of Europe. It lives in holes which it digs in the ground, and only comes forth at night in order to feed. It eats vegetable substances only, such as roots, bark, etc. The array of spines or quills with which this animal is covered

forms its principal means of defence. If it cannot escape, it suddenly stops, erects all its quills, and runs backward against its adversary, striking the quills against him by the weight of its body.

Occasionally a looser quill than usual remains in the wound or falls to the ground, which evidently gave rise to the foolish error that the porcupine could dart its weapons at its adversary from a



THE PORCUPINE.

distance. There are two kinds of these quills—one kind long and curved, the other short, thick, and pointed. These last are the weapons of defence, as the former are too slender to do much service.

When the porcupine walks, its quills make a kind of rustling sound, caused principally by those arranged on the tail, which are large, hollow, and are supported on long, slender stalks.

The American Indians use the quills for ornamenting various parts of their dress, especially their moccasins or skin shoes. The length of the porcupine is about two feet, and its spines or quills are from six to fourteen inches long.

The CAPYBARA or CHIGUIRA is the largest of all the Rodentia. At first sight, it looks very like a pig, and its skin is covered thinly with hairs like bristles, which adds to the resemblance. It inhabits the borders of lakes and rivers in many parts of Southern America. During the day, it hides among the thick herbage of the banks, only wandering forth to feed at night, but when alarmed it instantly makes for the water, and escapes by diving. It is hunted for the sake of its flesh, which is said to be remarkably good. The food of the capybara consists of grass, vegetables and fruits. Its length is about three feet six inches.

The GUINEA-PIG or RESTLESS CAVY belongs to the sub-family Caviina. It was originally brought from South America. Its beauty is its only recommendation, as it shows little intelligence and is never used for food. Children, and particularly school-boys, are fond of keeping guinea-pigs, as they are wonderfully prolific, easy to manage, and do not make much noise. They are popularly supposed to keep off rats, and are therefore patronized in connection with rabbit-hutches.

The HARE is one of our most common quadrupeds. When full-grown, it is larger than the rabbit and exceedingly like that animal, but its color is slightly different, and the black spot on the extremity of its ears is a simple method of distinguishing it. The hare does not burrow like the rabbit, but makes a kind of nest of grass and other materials. In its nest, called a "form," the hare lies, crouching to the ground, its ears laid along its back, and, trusting to its concealment, will often remain quiet until the foot of an intruder almost touches it.

Innumerable foes besides man surround this animal. Foxes, ferrets, stoats, and all their tribe, are unmerciful enemies, and sometimes a large hawk will destroy a leveret, as the young hare is called. Although destitute of all means of defence, it often escapes by the quickness of its hearing and sight, which give it timely warning of the approach of an enemy. In cold countries the hare changes its fur during winter, and becomes white, like the Arctic fox and ermine.

The well-known RABBIT is rather smaller than the hare, but closely resembles it in form. It lives in deep holes, which it digs in the ground. The female rabbit forms a soft nest at the bottom of her burrow, composed of fur torn from her body, hay, and dried leaves. Here the young rabbits are kept until they are strong enough to shift for themselves and make their own burrows.

The tame rabbit is only a variety, rendered larger by careful feeding and attendance.

The JERBOAS are celebrated for their powers of leaping. Their long hind legs enable them to take enormous springs, during which their tails serve to balance them. A jerboa when deprived of its tail is afraid to leap.

The foot of the jerboa is defended by long bristly hairs, which not only give the creature a firm hold of the ground for its spring, but also defend the foot from the burning soil on which it lives. The timidity of the jerboa is very great, and on the slightest alarm it instantly rushes to its burrow, but if intercepted, skims away over the plain with such rapidity that it seems to fly, and when at full speed a swift greyhound can scarcely overtake it.

Grain and bulbous fruits are its chief food ; while eating, it holds the food with its fore paws, and sits upright on its haunches, like the squirrels and marmots.

The DORMOUSE is very common in all the warmer parts of



THE HARE.

Europe. It lives in copses and among brushwood, through which it makes its way with such rapidity that it is very difficult to capture. During the winter its lies torpid, but takes care to have a stock of food laid up, on which it feeds during the few interruptions to its slumbers. A warm day in winter will rouse it, but during the cold weather it lies rolled up, with its tail curled round its body. While in this torpid state, a sudden exposure to heat kills it, but a gentle warmth, such as holding it in the hand, rouses it without injury.

It lives principally on nuts, acorns, and grain. It brings up its young in a nest composed of leaves and hay, and seems to be fond of society in its household labors, as ten or twelve nests have been seen close to each other.

The SQUIRREL is a very common animal in the woods, where numbers may be seen frisking about on the branches, or running up and down the trunks. If alarmed, it springs up the tree with extraordinary activity, and hides behind a branch. By this trick it escapes its enemy, the hawk, and by constantly slipping behind the large branches, frequently tires him out. The activity and daring of this little animal are extraordinary. When pursued, it makes the most astonishing leaps from branch to branch, or from tree to tree, and has apparently some method of altering its direction while in the air, possibly by means of its tail acting as a rudder.

It is easily domesticated, and is very amusing in its habits when suffered to go at large in a room or kept in a spacious cage; but when confined in one of the cruel wheel cages, its energies and playfulness are quite lost. Men often go about with squirrels for sale, and try to sell old squirrels for young, but this imposition may be detected by looking at the teeth of the animal, which are nearly white if young, but if old are of a light yellow. Let the purchaser beware of very tame and quiet squirrels. These are generally ani-

mals just caught and perfectly wild, but are made sedate by a dose of opium. The color of the squirrel is usually a deep reddish brown, and its tail so large and bushy as to shade its whole body when carried curled over its back.

WOODCHUCK.—A small animal found almost all over the United States and Canada. It is somewhat larger than a rabbit and is usually blackish gray on the back and reddish brown below. It digs



THE SQUIRREL.

deep holes in the ground, with several parts and entrances, and so built that the water cannot run into them. Its food is chiefly plants, vegetables, and fruit, and it is often a great pest to the farmer. Woodchucks are very cleanly in their habits, and make pretty pets when tamed. In the Southern States they are sometimes called ground-hogs.

The RUMINANTIA, or animals that chew the cud, include the oxen, sheep, and goats, deer, giraffe, and camels. They have a peculiar construction of stomach, which receives the freshly gathered food, retains it for some hours, and then passes it back into the mouth to be re-masticated. The Ox is spread widely over the earth, scarcely any country being without its peculiar breed. In England and this country, where it is our most useful domesticated animal, there are many breeds throughout the States, generally distinguished by the length or shape of their horns. There is the "long-horned breed" from Lancashire, England, the "short-horned" from Durham, the "middle-horned" from Devonshire, and the "polled" or hornless breed. Each of these breeds has its particular value; some fatten easily, and are kept especially for the butcher. Others give milk and are valuable for the dairy. The best dairy cow is the Alderney, a small, short-horned animal, furnishing exceedingly rich milk.

In some parts of America oxen are used to draw wagons, or to drag the plough. They are not so strong as horses, and their movements are much slower.

Every part of the ox is of value. We eat his flesh, we wear shoes soled with his skin, our candles are made from his fat, our tables are joined with glue made from his hoofs, his hair is mixed with the mortar of our walls, his horns are made into combs, knife-handles, drinking-cups, etc., his bones are used as a cheap substitute for ivory, and the fragments ground and scattered over the field as manure, and soup is made from his tail.

The young ox is called a calf, and is quite as useful in its way as the full-grown ox. The flesh is termed veal, and by many preferred to the flesh of the ox or the cow, which is called beef; jelly is made from its feet. The stomach is salted and dried, and is named rennet. Cheese is made by soaking a piece of rennet in water, and pouring it into a vessel of milk. The milk soon forms



THE ELEPHANT.



a curd, which is placed in a press, and the watery substance, called whey, squeezed from it. The curd is colored and salted, and is then cheese.

The CAPE BUFFALO is a native of Southern Africa. It is exceedingly ferocious and cunning, often lurking among the trees until an unsuspecting traveller approached, and then rushing on him and destroying him. The ferocious creature is not content with killing his victim, but stands over him mangling him with its horns, and stamping on him with its feet.

The BISON or BUFFALO formerly inhabited the plains or prairies of North America in countless multitudes. Its enormous and heavy mane, its fierce eyes and lowering appearance, give this animal a most terrific aspect. The American Indians constantly hunted the bison, which they called by the name of buffalo. Their weapons were principally bows and arrows, apparently weak and small, but which, when wielded by a skillful hand, would strike the huge bison to the heart. In Catlin's account of his travels among the North American Indians are many most interesting accounts of "buffalo hunts." Mounted on a swift horse, and armed with a spear and bow and arrows, the Indians kill great numbers of these animals. They ride close up to the bison, and with the greatest apparent ease bury an arrow up to its feather in the creature's body. Indeed, many instances are known where the slight Indian bow, drawn without any perceptible effort, has thrown the arrow completely through the body of the huge animal. The skin is so valuable that every exertion is made to procure it. Of the buffalo's hide they used to make their wigwams and tents, their shields, their robes, their shoes, etc. The Indians also sold the hides to the traders for a considerable sum, so that an Indian can also measure his importance and wealth by the number of hides that he takes.

The hunters take advantage of the gregarious instincts of this animal, and hunt them when they are collected together in their vast herds, which blacken the face of the prairie for miles. Sometimes they form in line, and drive the herd to the edge of some tall cliff, over which they fall in hundreds, those behind pushing on those in the van; or sometimes they form a large circle, driving the animals into a helpless and leaderless mass, into which the hunters spring, leaving their horses, and treading with the skill of rope-dancers on the backs of the bewildered bisons, whom they slaughter as they pass, stepping from one to the other, and driving the sharp blade of their spear through the spine of the animal whose back they have just quitted.

The principal use of the flesh of the bison is to make "jerked meat" of it. This is made by cutting the meat into long narrow slips, and drying them in the sun. The cow is preferred to the bull for conversion into jerked meat, while the skin of the bull is more valuable than that of the cow, from the mass of wooly hair about the shoulders.

The flesh of the bison is tolerable eating, but the "hump" appears from all accounts to be unapproachable in delicacy. It is exceedingly tender, and possesses the property of not cloying even when eaten in excess. The fat also is said to be devoid of that sickening richness which is usually met with in our domesticated animals.

The cow is smaller than the bull, and considerably swifter. She is also generally in better condition and fatter than her mate, and in consequence the hunters who go to "get meat" always select the cows from the herd.

The YAK inhabits Tartary. Of this animal in a native state little or nothing is known. The name of "grunniens," or grunting, is derived from the peculiar sound that it utters. The tail of



THE BISON.

the yak is very long and fine, and is used in India as a fan or whisk to keep off the mosquitoes. The tail is fixed into an ivory or metal handle, and is then called a chowrie. Elephants are sometimes taught to carry a chowrie, and wave it about in the air above the heads of those who ride on its back. In Turkey, the tail is called a "horse-tail," and is used as an emblem of dignity.

From the shoulders of the yak a mass of long hair falls almost to the ground, something like the mane of a lion. This hair is applied to various purposes by the Tartars. They weave it into cloth, of which they not only make articles of dress, but also tents, and even the ropes which sustain the tents.

The GNOO, or WILDEBEEST, inhabits Southern Africa. At first sight it is difficult to say whether the horse, buffalo, or deer predominates in its form. It however belongs to neither of these animals, but is one of the bovine antelopes. The horns cover the top of the forehead, and then, sweeping downward over the face, turn boldly upward with a sharp curve. The neck is furnished with a mane like that of the horse, and the legs are formed like those of the stag. It is a very swift animal, and when provoked, very dangerous. When it attacks an opponent it drops on its knees, and then springs forward with such force, that, unless he is extremely wary and active, he cannot avoid its shock.

When it is taken young, the gnoo can be domesticated, and brought up with other cattle, but it will not bear confinement, and is liable to become savage under restraint. There are several species of this animal, the common Gnoo, the Cocoon, and the Brindled Gnoo. The size of the gnoo is about that of a well-grown ass, that is, about four feet in height. Its flesh is in great repute both among the natives and colonists.

The KOODOO is a native of South Africa, living along the wooded borders of rivers. It is chiefly remarkable for its beautiful

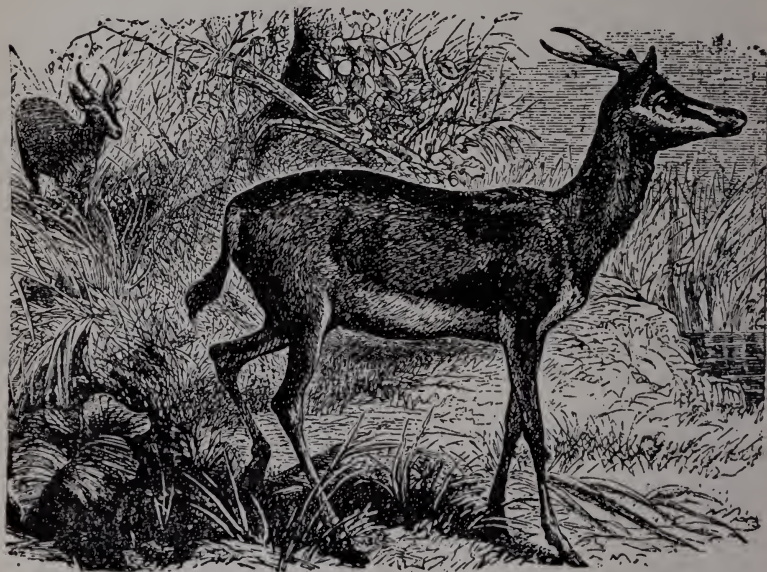
shaped horns, which are about four feet in length and twisted into a large spiral of about two turns and a half. A bold ridge runs along the horns and follows their curvature. When hard pressed it always takes to the water, and endeavors to escape by its powers of swimming. Although a large animal, nearly four feet in height, it can leap with wonderful activity. The weight of the horns is very considerable, and partly to relieve itself of that weight, and partly to guard them from entanglement in the bushes among which it lives, and on which it feeds, it carries its head backward, so that the horns rest on its shoulders.

The GAZELLE inhabits Arabia and Syria. Its eyes are very large, dark, and lustrous, so that the Oriental poets lovè to compare the eyes of a woman to those of a gazelle. It is easily tamed when young, and is frequently seen domesticated in the court-yards of houses in Syria. Its swiftness is so great that even a greyhound cannot overtake it, and the hunters are forced to make use of hawks, which are trained to strike at the head of the gazelle, and thus confuse it, and retard its speed, so as to permit the dogs to come up. The height of the gazelle is about one foot nine inches ; its color a dark yellowish brown fading into white on the under parts.

The CHAMOIS is found only in mountainous regions, especially the Alpine chains of Europe and Western Asia. It lives on the loftiest ridges, displaying wonderful activity, and leaping with certainty and security on places where the eye can hardly discern room for its feet. The skin of the chamois is used extensively by shoemakers.

THE ANTELOPE.—The Pronghorn, one of the antelopes of North America, is about as large as the common deer, and has coarse hair, yellowish-brown above, and white on the rump and under part. The hoofs, horns, and end of the nose are black.

The horns, which grow nearly straight up and bend toward each other at the top, have each a single branch or prong about half way up, and from this the animal gets its name. The pronghorn is often seen by travellers on the Pacific Railway. One will sometimes run beside a train for a mile or two, as if trying to run a race



THE GAZELLE.

with it. Its speed is so great that it is almost useless to chase it ; but it is not a hard animal to kill, because it has so much curiosity that if the hunter waves a handkerchief it will come near enough to be shot. The Indians lie flat on their backs and kick up their heels, with a rag or some other thing fastened to them, and the

pronghorns, coming up to see what the strange thing is, get near enough to be killed with the bow and arrow.

The IBEX inhabits the Alpine regions of Europe and Western Asia. It is instantly recognized by its magnificent horns, which curve with a bold sweep from the head almost to the haunches. The horns are surrounded at regular intervals with rings, and are immensely strong, serving, as some say, to break the fall of the ibex when it makes a leap from a height. The height of the ibex is two feet six inches ; the length of its horns often three feet.

The common GOAT is not in much request in England and America, but in some other countries, as Syria and Switzerland, large herds of goats are kept for the sake of their milk, and in fact almost entirely take the place of the cow. The most celebrated variety of this animal is the Cashmere goat, which furnishes the beautiful fine wool from which the costly Cashmere shawls are made.

THE SHEEP.—There are many kinds of sheep, among which the common sheep, the long-tailed sheep, and the Wallachian sheep are the most conspicuous. Next to the cow the sheep is our most useful animal. California produces better wool than any country ; for although the wool of the Spanish sheep is finer than ours, it is much less in quantity. The Merino, as this sheep is called, is annually conducted from one part of the country to another, and back again.

The Long-tailed Sheep inhabits Syria and Egypt. Its tail is so large and so loaded with fat, that, to prevent it from being injured by dragging on the ground, a board is fastened to the under side of it, and wheels are often attached to the board. The peculiar fat of the tail is considered a great delicacy, and is so soft as to be frequently used as butter. The weight of a large tail is about seventy pounds.

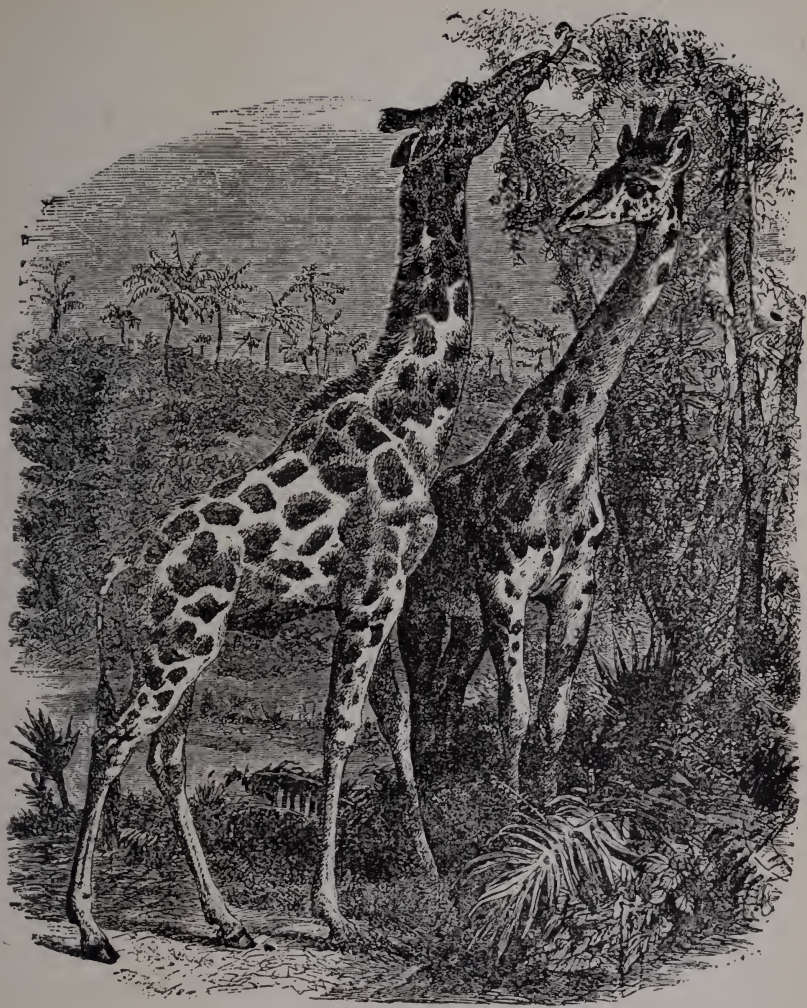
The Wallachian or Cretan Sheep is found in Crete, Wallachia, Hungary, and Western Asia. Its horns are exceedingly large, and are twisted in a manner resembling the koodoo. It is very strong, and extremely vicious and unruly. In this and several other sheep the fleece is composed of wool and hair mixed. The hair of the Wallachian sheep is long and silky like that of a spaniel, and of great length, falling almost to the ground.

THE GIRAFFE.—This beautiful and extraordinary animal is found only in South Africa. As the gnou seems to combine the properties of the antelope, horse, and buffalo, so the giraffe appears to bear the characteristics of the antelope and the camel. In the opinion of modern naturalists, it holds a place by itself between the deer and antelopes. It forms, at all events, a group to which no other animals belong.

The height of the giraffe varies from thirteen to eighteen feet. Its beautiful long neck enables it to browse on the leaves of the trees on which it feeds. It is very dainty while feeding, and plucks the leaves one by one with its long and flexible tongue.

On its head are two very remarkable projections, closely resembling horns. These projections are not horns, but only thickenings of the bone of the skull, covered with skin, and bearing a tuft of black hair at the extremity of each. The fore legs at first sight appear longer than the hind ones, but this apparent difference is only caused by the great length of the shoulder-blades, as both pair of legs are of the same length at their junction with the body. Its eyes are very large and prominent, so that the animal can see on every side without turning its head. Just over and between the eyes is a third bony prominence, resembling the projecting enlargements of the skull, called horns.

The use of these projectlons is not very well known, as although in play the giraffe will swing its head round and strike with it. vet



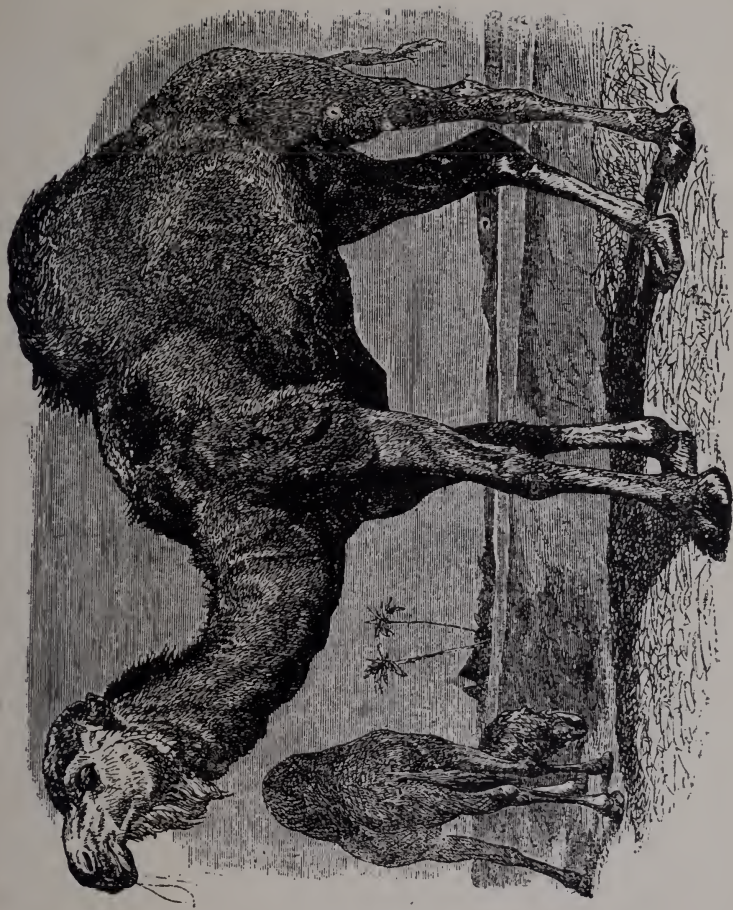
THE GIRAFFE.

when it wishes to repel an assailant it has recourse to violent and rapid kicks from its hind legs. So light and swift are these kicks that the eye can scarcely follow them, and so powerful are they that the lion is not unfrequently driven off by them.

The skin of this animal is an inch and a half in thickness, so that it is necessary for the hunter to make very sure of his aim before he fires at an animal so well defended. The giraffe has much difficulty in reaching the ground with its mouth, nor does it often attempt to do so, unless it is bribed with something of which it is very fond, such as a lump of sugar. It then straddles widely with its fore legs, and with some trouble succeeds in reaching the object aimed at. The first living giraffes, in the possession of the Zoological Society, were brought by M. Thibaut. He succeeded in taking four, all of which he brought with him. One of them is still living. From this stock several giraffes have been born, some of which are now in England, and others have been sent to other countries.

The tongue of the giraffe is one of the most remarkable parts of its structure. It is very flexible and capable of great changes of form, the giraffe being able to contract it so that its tip could enter an ordinary quill. The animal is very fond of exercising its tongue, and sometimes pulls the hairs from its companions' manes and tails, and swallows them—no very easy feat, as the hair of the tail is often more than four feet long.

The movements of the giraffe are very peculiar, the limbs of each side appearing to act together. It is very swift, and can outrun a horse, especially if it can get among broken ground and rocks, over which it leaps with a succession of frog-like hops. The giraffes which were born and bred in this country seem very healthy and are exceedingly tame. They eat herbs, such as grass, hay, carrots, and onions. When cut grass is given to them, they



THE CAMEL.

eat off the upper parts and leave the coarse stems, just as we eat asparagus.

THE CAMEL.—There is much confusion about the names of the camels. The Bactrian Camel is distinguished by bearing two humps on its back, the Arabian Camel by bearing only one. The Arabian camel is sometimes, but erroneously, called the Dromedary, as the Dromedary is a lighter variety of that animal, and only used when dispatch is required. The camel forms the principal wealth of the Arab; without it he could never attempt to penetrate the vast deserts where it lives, as its remarkable power of drinking at one draught sufficient water to serve it for several days, enables it to march from station to station without requiring to drink by the way. The peculiar structure of its stomach gives it this most useful power. In its stomach are a great number of deep cells, into which the water passes, and is then prevented from escaping by a muscle which closes the mouth of the cells. When the camel feels thirsty, it has the power of casting some of the water contained in these cells into its mouth. The habits of this animal are very interesting.

The foot of the camel is admirably adapted for walking on the loose sand, being composed of large elastic pads, which spread as the foot is placed on the ground. To guard it from injury when it kneels down to be loaded, the parts of the body on which its weight rests are defended by thick callosities. The largest of these callosities is on the chest, and others are placed on the joints of the legs.

The Bactrian camel inhabits Central Asia, Thibet, and China.

The LLAMAS, of which there are several species, inhabit America, and are used for the same purpose as the camel. When wild they are very timid, and fly from a pursuer the moment that they see him; but their curiosity is so great that the hunter often

secures them by lying on the ground and throwing his legs and arms about. The llamas come to see what the extraordinary animal can be, and give the hunter an opportunity of firing several shots, which the astonished animals consider as a part of the performance.

The llamas, like the camel, have a series of cells in the stomach for containing water, and can go for several days without requiring to drink. If too heavily laden, or when they are weary, they lie down, and no threats or punishment will induce them to rise, so that their masters are forced to unload them. When offended they have a very unpleasant habit of spitting at the object of their anger.

The fleece of the llama is very long and fine, more resembling silk than wool. It is very valuable, and is extensively imported into this country for the purpose of making cloth and other fabrics. The fleece of the Alpaca is considered the best, as it is sometimes twelve inches in length, and very fine. In Chili and Peru the natives domesticate the llama, which in the state of captivity frequently becomes white. It is by no means a large animal, as it measures about four feet six inches in height. In general shape it resembles the camel, but has no hump on its back, and its feet are provided with sharp hoofs for climbing the rocky hills among which it lives.

The RED-DEER, or STAG, is the largest of our deer. In the language of hunters, it bears different names, according to the size of its horns, which increase year by year. All the male deer have horns, which they shed every year, and renew again. The process of renewal is most interesting. A skin, filled with arteries, covers the projections on which the horns rest. This skin, called the "velvet," is engaged in continually depositing bone on the foot-stalks, which rapidly increase in size. As the budding horns increase, the velvet increases also, and the course of the arteries is

marked on the horn by long furrows, which are never obliterated. When the horn has reached its full growth, it cannot be at once used, as the velvet is very tender, and would bleed profusely if wounded. The velvet cannot be suddenly removed, as the blood that formed the arteries would rush to the brain and destroy the animal. A ring of bone forms round the root of each horn, leaving passages through which the arteries pass. By degrees, these passages become narrow, and finally close entirely, thus gradually shutting off the blood. The velvet being deprived of its nourishment, dies, and is peeled off by the deer, by rubbing against a tree, leaving the white, hard horn beneath.

Hunting the stag is a very favorite amusement in many countries, and packs of hounds, called stag-hounds, are kept expressly for that purpose.

The FALLOW-DEER are usually seen in parks. One large buck always takes the lead, and suffers none but a few favorite does to approach his regal presence, all the other bucks moving humbly away directly he makes his appearance. They are generally tame, and will suffer people to come very close to them; but at certain times of the year they become savage, and will not permit any one to approach their domains. If an intruder is bold enough to venture within the proscribed distance, the buck will instantly charge upon him. They soon become familiar with those who treat them with kindness, and will eat from their hands.

The REINDEER is found throughout the Arctic regions of Europe, Asia, and America. The finest animals are those of Lapland and Spitzbergen. The Laplander finds his chief wealth in the possession of the reindeer, which not only serves him as a beast of burden, but furnishes him also with food and clothing. A Laplander in good circumstances possesses about three or four hundred deer, which enable him to live in comfort. The subsistence of one



THE RED-DEER, OR STAG.

who only possesses one hundred is very precarious, and he who has only fifty usually joins his animals with the herd of some richer man, and takes the menial labors upon himself.

The reindeer feeds principally on a kind of lichen, which it scrapes from beneath the snow. During the winter its coat thickens, and assumes a lighter hue, many deer being almost white. Its hoofs are divided very high, so that when the animal places its foot on the ground, the hoofs spread wide, and as it raises the foot, a snapping noise is heard, caused by the parts of the hoofs closing together. When harnessed to a sledge, it can draw from 250 to 300 pounds' weight at about ten miles an hour.

The EUROPEAN ELK inhabits the northern parts of Europe. It was considered at one time to be identical with the American Elk, but naturalists now believe it to be a distinct animal. Its usual pace is a high awkward trot, but when frightened, it sometimes gallops. It is very strong, and can destroy a wolf with a single blow of its large and powerful horns. In Sweden it was formerly used to draw sledges, but on account of the facility of escape offered to criminals by its great speed, the use of it was forbidden under high penalties. The skin of the elk is so tough, that a regiment of soldiers was furnished with waistcoats made of its hide which could scarcely be penetrated by a ball.

Like the reindeer, the elk makes a great clattering with its hoofs when in rapid motion. It is a good swimmer, and is fond of taking to the water in summer-time.

We now arrive at the PACHYDERMATA, or thick-skinned animals which do not chew the cud. The first on the list is the HORSE, an animal too well known in all its varieties to need much description.

The Arabian Horse is a model of elegance and beauty. The





PIGEONS AND PEACOCK.



THE REINDEER.

Arab treats his horse as one of his family ; it lives in the same tent with him, eats from his hand, and sleeps among his children, who tumble about on it without the least fear. Few Arabs can be induced to part with a favorite horse.

The plains of La Plata and Paraguay are tenanted by vast herds of wild horses. These are captured by the lasso, bitted, mounted, and broken within an hour, by the daring and skilful Gauchos.

The English Horse, from which the best horses in the United States have come, has much Arabian and Barb blood in it. The racehorse is swifter for short distances than the best Arabian horse. It is much like the Arabian in looks, but is taller and longer, and has changed in color. The Arabian horse is generally white, light gray, or flea-bitten, but the racehorse is more usually bay and chestnut. The changes have probably come from the difference in the climate and in the way the horses are brought up. The American racehorse is descended from the English racehorse, and is therefore also of Arabian blood.

The Godolphin Arabian, Flying Childers, Iroquois, and Fox-hall are four of the most celebrated racers.

The fastest mile ever run by a racehorse in the United States up to 1894 was made by the horse Salvator in one minute thirty-five and one-half ( $1.35\frac{1}{2}$ ) seconds.

The Trotting Horse of the United States and Canada is the fastest in the world. It is not a thoroughbred horse, or a horse of pure racing blood, like the racehouse, but is generally a descendant of a cross between the racehorse and some common breed ; but a few thoroughbred racing horses have been taught to trot very fast. It is not usually as tall as the running horse, and is sometimes small. There is also a good breed of trotting horses in Russia, called Orloff trotter, which is faster than common horses, but not



THE RACEHORSE.

so fast as the American trotter. The fastest mile ever trotted in the United States up to 1894 was made at Galesburg, Illinois, by the mare Alix in two minutes and three and three-quarter ( $2.03\frac{3}{4}$ ) seconds.

Draught Horses, or horses used for drawing heavy loads, are raised in many countries. In France the Percheron breed has been noted for hundreds of years. Many of them are to be seen in Paris, where they are much used for drawing omnibuses and business wagons, and some of them are used in the United States. They are large, heavy horses, with large heads. In England the breeds called the Suffolk, the Cleveland Bay, and the Clydesdale are noted for their size and strength. The Flanders horse, of Belgium and Holland, is very large, heavy, and strong. Many of the great horses used by brewers in London and Paris are of this breed.

All these breeds are called heavy draught horses, because they are used in the heaviest kinds of trucks and large wagons. There are also light draught horses, for drawing lighter loads, which are not quite so heavy in the body and are quicker in their motions.

The carriage horse is of a lighter and more elegant form than the common draught horse, but is generally large and strong. The saddle horse should be a little smaller than the carriage horse, and should be graceful and active in all its movements. It should be taught not only to obey the rein, but to understand every motion of its rider.

Ponies are found in many countries. Among the most noted are the Shetland ponies, raised in the islands of the same name, north of Scotland, where they are called Shelties. Some of these little horses are not much larger than a great dog, but they are very strong, and will carry a man with ease. The Indians of the western part of the United States have a breed of ponies which are very



THE ZEBRA.

hardy and strong. One of them will travel all day long with a heavy man on its back.

THE ASS.—The humble and hardy ass is scarcely less serviceable to man than the more imposing horse. In this country, where it meets with harsh treatment, is scantily fed, and only used for laborious tasks, it is dull and obstinate; but in the East, where it is employed by rich nobles, and is properly treated, it is an elegant and spirited animal, with good action and smooth coat.

THE ZEBRA is found in South Africa. This beautiful animal lives in troops among the mountains, shunning the presence of man. It is easily distinguished by the regular stripes of brownish black with which its whole body is covered, even down to the hoofs. It is very wild and suspicious, carefully placing sentinels to look out for danger. Notwithstanding these precautions, several zebras have been taken alive, and some, in spite of their vicious habits, have been trained to draw a carriage. In all probability it might be domesticated like the ass, as the black cross on the back and shoulders of the latter animal prove the affinity between them. The voice of the zebra is very peculiar.

THE ELEPHANT.—Of this magnificent animal, whose form is familiar to every eye, two species are known, the Indian and the African. The anatomy of the huge quadruped is well worthy of consideration. Its head and tusks are so very heavy that no long neck would bear them; the neck is therefore very short. But this shortness of neck prevents the elephant from putting its head to the ground, or from stooping to the water's edge. This apparent defect is compensated by the wonderful manner in which its upper lip and nose are elongated, and rendered capable of drawing up water or plucking grass. In the proboscis or trunk there are about forty thousand muscles, enabling the elephant to shorten, lengthen, coil up, or move in any direction this most ex-

traordinary organ. The trunk is pierced throughout its length by two canals, through which liquid can be drawn by suction. If the elephant wishes to drink, after drawing the liquid into its trunk, it inserts the end of its proboscis into its mouth, and discharges the contents down its throat ; but if it merely wishes to wash itself or play, it blows the contained liquid from the trunk with great violence. Through the trunk the curious trumpet-like voice of the elephant is produced. At the extremity is a finger-like appendage, with which it can pick up small objects. In order to sustain the muscles of the jaw and neck, the head must be very large ; were it solid, it would be very heavy. The skull is therefore formed of a number of cells of bone, forming the necessary expanse without the weight, leaving but a very small cavity for the brain.

The Indian Elephant is almost invariably taken from its native haunts and then trained. The Indian hunters proceed into the woods with two trained female elephants. These advance quietly, and by their blandishments so occupy the attention of any unfortunate male that they meet, that the hunters are enabled to tie his legs together and fasten him to a tree. His treacherous companions now leave him to struggle in impotent rage, until he is so subdued by hunger and fatigue that the hunters can drive him home between their two tame elephants. When once captured he is easily trained.

In captivity, it is very docile and gentle, but sometimes when provoked, will take a very ample revenge. Of this propensity, many anecdotes are told. The tusks and teeth of the elephant furnish exceedingly fine ivory, which is used for various purposes, such as knife-handles, combs, billiard-balls, etc.

All elephants are fond of the water, and sometimes submerge themselves so far that nothing but the tip of the proboscis remains above the surface. In a tame state, the elephant delights in con-

cealing itself below the water, and deluging the spectators with a stream sent from its trunk.

The African Elephant is distinguished from the Indian Elephant by the markings of its teeth and some differences in form.

The TAPIR forms one of the links connecting the elephant with the hog. The snout is lengthened into a kind of proboscis like that of the elephant, but it is comparatively short, and has no finger-like appendage at the extremity.

The Common Tapir is spread throughout the warmer regions of South America. It sleeps during the day, and wanders about at night in search of its food, which consists of watermelons, gourds, and other vegetables. It is very fond of the water, and can remain below the surface for a considerable period. It is a very powerful animal, and as it is furnished with a very thick hide, it plunges through the brushwood, breaking its way through any obstacles that may oppose its progress. Its disposition is gentle, but when annoyed it sometimes rushes at its antagonist, and defends itself vigorously with its powerful teeth. The jaguar frequently springs on it, but is often dislodged by the activity of the tapir, who rushes through the bushes immediately that it feels the claws of its enemy, and endeavors to brush him off against the thick branches. The height of the American Tapir is from five to six feet. The Malay Tapir is somewhat larger, and is known by the grayish white color of the loins and hind quarters, which give the animal an appearance as if a white horse-cloth had been spread over it.

THE BOAR.—The animals composing the Hog tribe are found in almost every part of the globe. Their feet are cloven and externally resemble those of the Ruminants, but an examination of the bones at once points out the difference.

The Wild Hog or Boar inhabits many parts of Europe, especially the forests of Germany, where the chase of the wild boar is



THE AFRICAN ELEPHANT.

a common amusement. In our Southern States the woods are full of half wild ones. Its tusks are terrible weapons, and capable of being used with fatal effect. They curve outward from the lower jaw, and are sometimes eight or ten inches in length. In India, where the boar attains to a great size, the horses on which the hunters are mounted often refuse to bring their riders within spear stroke of the infuriated animal, which has been known to kill a horse and severely injure the rider with one swoop of its enormous tusks.

The DOMESTIC HOG scarcely needs any description. It is by no means the unclean and filthy animal that moralists love to represent it. It certainly is fond of wallowing in the mire, as are the elephant, tapir, etc., but no animal seems to enjoy clean straw more than the hog. We shut it up in a dirty narrow crib, give it any kind of refuse to eat, and then abuse it for being a dirty animal and an unclean feeder.

The BABYROUSSA inhabits the Molucca Islands and Java. It is remarkable for possessing four tusks, two of which proceed from the upper jaw, and do not pass out between the lips, but through an aperture in the skin, half way between the end of the snout and eyes. The sockets of the two upper tusks are curved upward, and give a singular appearance to the skull of the animal. It looks a ferocious animal, nor do its looks contradict its habits, as it is very savage, and cannot be hunted without danger. Yet when taken young it can be tamed without much difficulty, and conducts itself much after the manner of a well-behaved pig.

THE RHINOCEROS.—There are, apparently, six species of this formidable animal, inhabiting various parts of Asia and Africa. They can be distinguished from each other by the number and shape of their horns, and the color of their bodies. Their habits are much alike.



THE INDIAN RHINOCEROS.

The rhinoceros is always a surly and ill-tempered animal, and is much given to making unprovoked attacks on man and beast, if it should happen to fancy itself insulted by their presence. Their chief peculiarity, the so-called horn, is a mass of fibres matted together, and closely resembling the structure of whalebone. Their feet are divided into three toes, encased in hoofs. The horn is not connected with the skull, but is merely a growth from the skin, from which it can be separated by means of a sharp penknife. Being made of very strong materials, it is employed in the manufacture of ramrods, clubs, and other similar implements. When properly worked it is capable of taking a very high polish, and is often cut into drinking-cups.

The organs of scent of the rhinoceros are very acute, and as the creature seems to have a peculiar faculty for detecting the presence of human beings, it is necessary for the hunters to use the greatest circumspection when they approach it, whether to avoid or kill, as in the one case it may probably be taken with a sudden fit of fury, and charge at them, or in the other case, it may take the alarm and escape.

The upper lip is used by the rhinoceros as an instrument of prehension, with which it can grasp the herbage on which it feeds, or pick up small fruit from the ground. The very tame rhinoceros in the Zoological Gardens will take a piece of bun or biscuit from a visitor's hand by means of its flexible upper lip.

THE HIPPOPOTAMUS.—There is, in all probability, but one species of hippopotamus. It inhabits Africa exclusively, and is found in plenty on the banks of many rivers in that country, where it may be seen gambolling and snorting at all times of the day.

These animals are quiet and inoffensive while undisturbed, but if attacked, they unite to repel the invader, and have been known to tear several planks from the side of a boat, and sink it. They



THE HIPPOPOTAMUS.

can remain about five or six minutes under water, and when they emerge they make a loud and very peculiar snorting noise, which can be heard at a great distance.

The hide is very thick and strong, and is chiefly used for whips. The well-known "cow-hides" are made of this material. Between the skin and flesh is a layer of fat, which is salted and eaten by the Dutch colonists of Southern Africa. When salted it is called Zee-koe speck, or Sea-cow's bacon. The flesh is also in some request.

The hippopotamus feeds entirely on vegetable substances, such as grass and brushwood. The fine animal now in the possession of the Zoological Society eats all kinds of vegetables, not disdaining roots.

From the construction of the head, the animal is enabled to raise its eyes and nostrils above the water at the same time, so that it can survey the prospect and breathe without raising more than an inch or two of its person from the water. In order to attain this object, the eyes are very small, and placed very high in the head, while the muzzle is very large, and the nostrils open on its upper surface.

The track of the hippopotamus may be readily distinguished from that of any other animal by a line of unbroken herbage which is left between the marks of the feet on each side, as the width of the space between the right and left legs causes the animal to place its feet so considerably apart, as to make a distinct double track.

The teeth of the hippopotamus are the mainstay of the dentist, who cuts from the tusk of a hippopotamus those series of elegant teeth which replace those that age or accident has struck out of the human mouth. The ivory is exceedingly hard, and does not readily lose its beautiful whiteness, being properties which render it especially valuable for such purposes. This is supposed by many to be the animal called Behemoth in Scripture.

The SEALS and WHALES, although they are truly mammalia, are inhabitants of the water, and specially formed for an aquatic existence.

The fore feet of the seal are used as fins, and the two hinder feet almost as the tail of a fish, to assist and direct its course. On



THE COMMON SEAL.

land the movements of this animal are very clumsy; it shuffles along by means of its fore feet, or rather paddles, and drags its hind feet after it.

Seals live during warm weather mostly in the cold regions of the north and south poles, and go into milder waters in the winter. Their food is chiefly fish, and they sometimes chase salmon quite

far up rivers. They like to bask in the sun upon rocks, sand-banks, or ice-floes, always keeping a good lookout for danger. They can see far, and their sense of smell is very sharp.

Seals live mostly on mollusks, crabs, and fish. In the winter they make holes in the ice, where they can come up to breathe. Sometimes one comes out to eat a fish. The Esquimaux watch near seal holes until one is seen coming up, then crawl softly along on the ice, making a cry like a seal, and the poor animal, who takes it for another seal, does not discover its mistake until it gets a deadly blow.

Seals are among the most useful of animals to man. The Greenlanders use their flesh for food ; their oil for light, warmth, and cooking ; their skins for clothes, boots, and coverings of boats and tents ; their sinews for thread and fishing-lines ; the skins of the entrails for window-curtains and shirts ; and their blood for making soup. Seal-skins are an important article of commerce, and the seal fishery is largely carried on along the coast of Newfoundland and Labrador, and also on the islands off the coast of Alaska. The fur in its natural state is yellowish, spotted and marked with brown, and is unfit for use until it is dyed. Dressed seal-skins are largely used for ladies' cloaks, capes, etc. The skins are tanned sometimes and made into a fine soft leather for pocket-books, card-cases, and other things. Seal oil, made from the blubber or fat, is more valuable than whale oil.

The length of the common seal is about four or five feet, and its weight often two hundred and twenty-four pounds. When surprised basking on the shore, it scrambles off toward the water ; but if intercepted, dashes at its antagonist, oversets him if possible, and makes its escape as fast as it can.

There are many seals known, among which are the Sea Leopard, a spotted species ; the Harp Seal, so called because the markings on its back resemble a lyre ; the Sea Bear and the Sea Lion.

The WALRUS inhabits the northern seas, but has been known to visit our coasts. The most remarkable point in the walrus is the great length of its upper canine teeth, which extend downward for nearly two feet, and resemble the tusks of the elephant. They



THE WALRUS.

furnish very fine ivory, and are extensively used by dentists in making artificial teeth, as teeth made from them remain white much longer than those made from the tusks of elephants. These tusks are used by the walrus for climbing the rocks or heaps of ice, and

also for digging up the sea-weeds on which the animal mostly subsists. It will also eat shrimps and young seals.

The walrus is often hunted for the sake of its oil, its flesh, its skin, and its teeth. It is generally found in troops ; and if one is wounded, its companions rush to its rescue, and attack the enemy with their sharp tusks, which they have been known to drive through the bottom of a boat. The length of the walrus is about fifteen or sixteen feet, and it yields from twenty to thirty gallons of excellent oil.

The CETACEA, or WHALE tribe, closely resembles the fishes, and have often been placed among these animals by naturalists. They, however, are distinguished by possessing warm blood, and, in consequence, being forced to rise at intervals in order to breathe the air, instead of separating from the water, by means of their gills, sufficient oxygen for supporting life.

Yet the whale remains under water for a time so much longer than could be borne by any other warm-blooded animal, that the most indifferent observer cannot fail to perceive that the whale is furnished with some plan for supporting life during its stay under the water.

Along the interior of the ribs there is a vast collection of blood-vessels, ramifying from one another, and capable of containing a large quantity of blood, having no immediate connection with that portion of the blood which is already circulating in the body. As fast as the exhausted and poisonous blood returns from its work, it passes into another reservoir adapted for its necessities, while a portion of the arterialized blood in the arterial reservoir passes into the circulation. It will be seen from this statement, that the whale, and others of the same order, possess more blood in proportion than any animals.

By means of this wonderful apparatus, a whale can remain

below the water for more than half an hour at a time. The depths to which the whale can descend are astonishing, wounded whales having been known to take down perpendicularly nearly 800 fathoms of line. The pressure of the water at this depth is very great, amounting, according to Scoresby's calculation, to 211,200 tons. This pressure would certainly cause the water to burst through their nostrils, and enter the lungs, were it not that the nostrils are formed so as to close themselves more firmly as the pressure of water increases.

The great Greenland Whale is found in the northern oceans. Many ships are annually fitted out for the capture of this creature, which, unhappily for itself, furnishes oil and whalebone. The oil is obtained from the thick layer of fatty substance, called blubber, which lies immediately under the skin; and the whalebone—which, by the way, is not bone at all—is obtained from the interior of the mouth, where it fringes the jaws, and acts as a sieve for the whale to strain his food through. The throat of the Greenland whale is so small that the sailors, who always use forcible expressions, say that a penny loaf would choke a whale.

The greater portion of its food consists of a little creature, about an inch and a half long, called *Clio borealis*, one of the marine Mollusca, belonging to the class Pteropida, or wing-footed creatures, so called because it propels itself through the water with two wing-like organs. The whale, when it wishes to feed, rushes through the water with its immense jaws wide open, enclosing a host of little sea animals and a few hogsheds of water. As the whale only wants the animals, and not the water, it shuts its mouth, and drives all the water out through the fringes of whalebone, leaving the little creatures in its jaws.

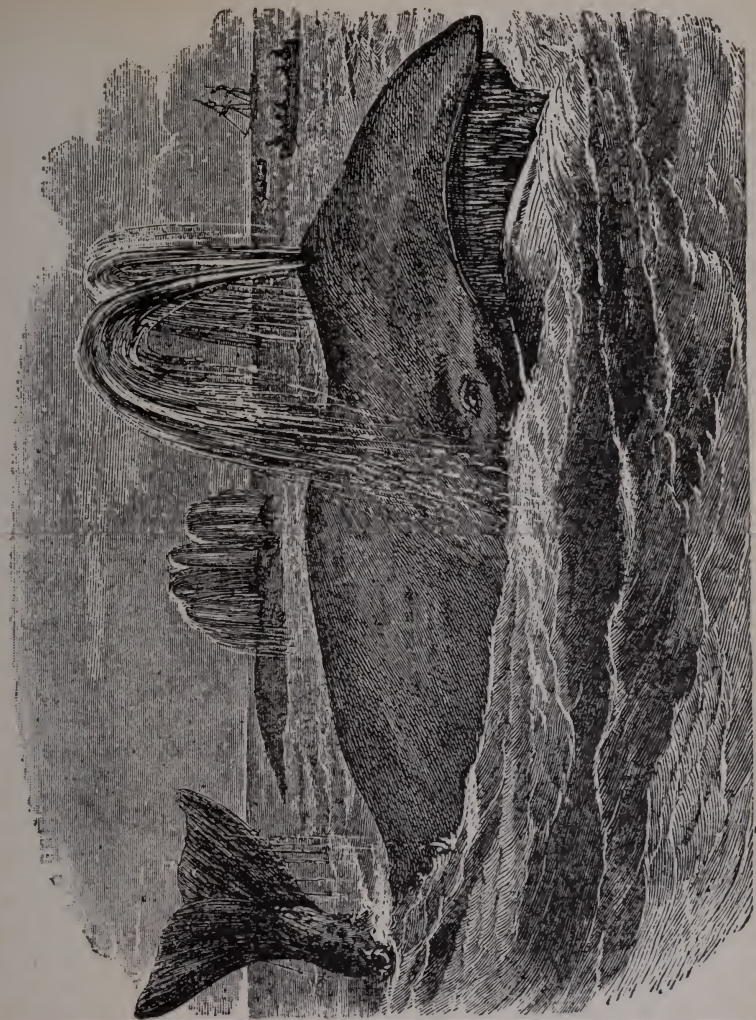
The whale shows great attachment for its young, which is called the cub, and on the approach of danger seizes it with its fin

or flipper, and carries it down out of the way. The whale has no fins, properly so called, as it is not a fish, but one of the mammalia. Its flippers, which supply the place of fins, are in fact fore legs, furnished with a kind of hand covered with a thick skin. They seem to be principally employed in balancing the animal. The hind legs are wanting. The length of this whale averages sixty feet. Its tail is placed transversely, and not vertically, as in the fishes.

THE CACHALOT.—This animal is not furnished with “baleen,” or whalebone, but is armed with a number of strong conical teeth, which are placed in the lower jaw, and which are often used in defending itself from the attacks of the whalers’ boats. In the Museum at Oxford is an under jaw-bone of this whale, sixteen and a half feet in length, containing forty-eight huge teeth. Besides this method of defence, it has a very unpleasant habit of swimming off to a distance, and then rushing at the boat with its head, thereby knocking it to pieces. One of these whales actually sank a ship by three or four blows from its head.

Spermaceti is obtained from the head of the cachalot, and it is this substance that causes the immense size of the head. When the whale is killed, a hole is made in the upper part of the head, and the spermaceti is baled out with buckets. When just procured it is almost fluid, but is rendered solid and transparent by being first drained of its oil, then boiled in water, and lastly set to cool in wide pans, where it soon assumes the white flaky appearance so well known in this country.

The skull of the cachalot occupies a comparatively small portion of the head, the huge mass at the end of the mouth being composed of a gristly kind of substance. The bone of the upper jaw occupies about one-fourth of the distance between the mouth and the top of the snout. It runs backward nearly straight until



THE GREENLAND WHALE.

just before the eyes, when it joins the remainder of the skull with a bold sweep. That part of the skull is called "Neptune's chair" by the sailors, and is the part where the spermaceti is found. The layer of blubber is thin, but yields a fine and valuable oil.

Ambergris, so long a riddle to all inquirers, is now found to be produced in the interior of the cachalot. This substance is of the consistency of wax, inflammable, and gives out a kind of musky odor. It was once in great repute as a medicine, but is now only used as a perfume. The cachalot, although an inhabitant of the Artic seas, has sometimes been found and captured off our coasts. The length of this whale is about seventy feet.

Those readers who have formed their ideas of DOLPHINS from the very graceful and elegant creatures represented under that name in the pictures of the "old masters," will find that the real animal differs very much from the ideal. Almost the whole history of the dolphin is imaginary. Alas! our unpoetical dolphin, when we have harpooned and brought him on deck, is only black and white, and all the change that he makes is that the black becomes brown in time, and the white changes to gray.

The creature that really displays these colors when dying is a fish called the Coryphene, and not a cetaceous animal of any kind. The sailors generally call it the dolphin, which has led to the mistake.

The dolphin is, like the whale, a warm-blooded animal, suckles its young, and it forced to come to the surface in order to breathe. Its snout is very long, and is apparently used for capturing such fish, and other animals as live in the mud. Its length is from six to ten feet, and several species are known.

THE PORPOISE.—These animals may be observed in plenty playing their absurd antics off every coast of America. There are numbers of them off the Nore, a place which they frequent greatly,

as it is the mouth of a river, and they find more food there than in the open sea. They tumble at the surface of the water for the purpose of breathing. In olden times the flesh of the porpoise constituted one of the standard delicacies of a public feast, but it has long since been deposed from its rank at the table. Its flesh has a very strong oily flavor.

It feeds on various fishes, but its great feasts are held when the periodical shoals of herrings, pilcards, and other fish arrive on the coasts. In the pursuit of its prey it frequently ventures some distance up a river, and is then often taken in nets by the fishermen.

The teeth of this animal are very numerous, and interlock when the jaws are closed, so that the fish, when once seized, cannot escape. Its length is about five feet, its color a rich black, becoming white on the under side.

The NARWHAL has unwittingly contributed to propagate a very old error. The spiral tusk of the narwhal was accustomed to be sold as the real horn of the unicorn; and as an accredited part of that animal, forming direct proof of its existence, it used to fetch a very high price. Of course, when the whale fishery was established, the real owner of the horn was discovered, and the unicorn left still enveloped in mystery.

The narwhal possesses two of these tusks, one on each side of its head. Only the left tusk projects, the other remaining within the head. Sometimes a specimen has been found with both tusks projecting, and some think that when the left tusk has been broken off by accident, the right one becomes large enough to supply its place. Although an inhabitant of the northern seas, it has several times visited our coasts. Its body is from thirty to forty feet in length, and its tusk from five to nine.

The SLOTH is another example of the errors into which even great naturalists are led from hasty observation. The great Cuvier

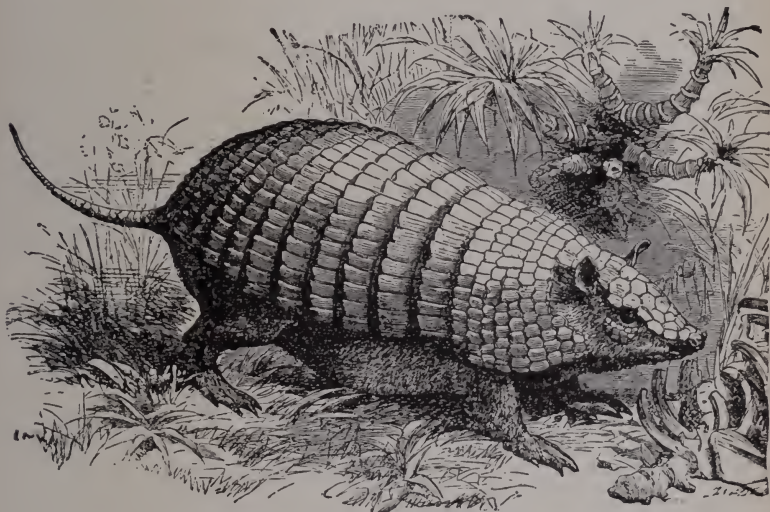
himself condemns the sloth as a degraded and miserable animal, moving with pain, and misshapen in form. Yet no animal is more fitted for its position than the sloth. "In its wild state the sloth spends its whole life in the trees, and never leaves them but through force or accident, and what is more extraordinary, not upon the branches, like the squirrel and monkey, but under them. He moves suspended from the branch, he rests suspended from the branch, and he sleeps suspended from the branch."

To render it fit for this singular mode of life, its long and powerful arms are furnished with strong curved claws, which hook round the branches, and keep the animal suspended without any effort. When on the ground, these claws are very inconvenient, and it can barely shuffle along; but when it is among its native branches, it moves with exceeding rapidity, particularly in a gale of wind, when it passes from branch to branch, and from tree to tree, with an activity which its movements on the ground by no means portend.

The PANGOLINS are immediately known by the peculiar, strong, horny plates with which their bodies are defended, giving them the appearance of animals enveloped in a suit of scale armor. When attacked they roll themselves up, wrap their tails round them, and raise the whole array of sharp-edged scales with which their body is covered, and bid defiance to almost any enemy except man. They live on ants and termites, or white ants, as they are called, which they take by thrusting their long, slender tongue among the ants, which adhere to it by a gummy saliva. When the tongue is covered it is rapidly retracted, and the ants swallowed. To obtain the ants, the pangolins are furnished with powerful claws to tear down the dwellings of their prey. The Long-tailed Manis is widely scattered through Africa, but is not very common. The length of its body is about two feet, and that of its tail rather more than

three. The Short-tailed Manis, or *Bajjerkeit*, is very common in India. Its entire length is about four feet.

The ARMADILLOS live exclusively in the warmer parts of America. They eat carrion, insects, and sometimes fallen fruit. They burrow with great rapidity, and can only be forced from their refuge by smoke or water. When they are hunted and are very



THE ARMADILLO.

close pressed, they either endeavor to escape their foes by rapidly burrowing into the earth, or try to oppose a partial resistance by rolling themselves up and trusting to the protection of their armor. The natives and colonists consider them great delicacies when roasted in their shells.

THE ANT-EATER.—This curious animal inhabits Guiana, Brazil, and Paraguay. As its name imports, it lives principally upon ants

and termites, which it procures in precisely the same manner as was related of the manis. Its short legs and long claws would lead an observer to suppose that its pace was slow and constrained, but when chased, it runs off with a peculiar trot, and with such rapidity that it keeps a horse to its speed to overtake it.

The tongue of this animal looks exactly like a great red worm, and when the creature is engaged in devouring its food, the rapid coiling and twisting of the tongue add in no small degree to the resemblance. The claws are very long and curved, and as they are used in tearing down the habitation of the termites or white ants, as they are called, are exceedingly strong. They are placed on the foot in such a manner that when the animal is walking, its weight rests on the outside of the fore feet and the outer edge of the claws, which make a great clattering if the ant-eater is walking upon a hard surface.

When it sleeps, it lies on one side, rolls itself up, so that its snout rests on its breast, places all its feet together, and covers itself with its bushy tail. The fur of the animal at all times resembles hay, and when it is thus curled up in sleep, it is so exactly like a bundle of hay, that any one might pass it carelessly, imagining it to be nothing but a loose heap of that substance. The ordinary length of this animal is about three feet seven inches, and its height about three feet.

THE DUCK-BILLED PLATYPUS.—Australia, where everything seems to be reversed, where the north wind is warm and the south wind cold, the thick end of a pear is next the stem, and the stone of a cherry grows outside, is the residence of this most extraordinary animal. When it was first introduced into Europe, it was fully believed to be the manufacture of some impostor, who with much ingenuity had fixed the beak of a duck into the head of some unknown animal. It will, however, be seen by the woodcut rep-

resenting the skull of the animal, that this duck-like beak really belongs to the animal, and is caused by a prolongation of some of the bones of the head.

It lives by the banks of rivers, in which it burrows like the water-rat. Curiously enough, it finds no difficulty in this labor, for the feet are so constructed that the animal can fold back the web at pleasure, and thus the foot is enabled to perform its task. It feeds upon water-insects and shell-fish, always rejecting the crushed shells after swallowing the inhabitant. The male has a sharp spur on its hind feet. The learned have given the animal several names. The native name for the creature is "Mullingong."

### BIRDS.

Birds are distinguished from the Mammalia by their general form, their feathery covering, and by producing their young enclosed in eggs. The different orders of birds are principally known by the character of the claws and beak. Before we pay attention to any individual species, we will first examine some of the structures common to all birds. One of the first great marks of distinction in birds is the wing. This organ is a modification of the arm or fore limb of mammalia, clothed with feathers instead of hair.

The bones of adult birds are not filled with marrow like the bones of Mammalia, but are hollow and filled with air, and are therefore rendered very light, a bone of a goose being barely half the weight of a rabbit's bone of the same size, after the marrow has been extracted. The bones forming the wing are worthy of notice for the beautiful manner in which they are jointed together, and arranged so as to give great strength together with lightness.

Most persons seem to fancy that the foot of the bird is that part which grasps the branch, or by means of which it walks on

the ground, that the joint above that member is the knee, and that the thigh is the feathered portion of the limb that proceeds from the bird's body. All these ideas are wrong; with this method of arrangement, the knee of the bird would bend backward, a thing which no perfectly formed knee ever did or ever will do.

The leg of a bird is formed on much the same principle as the hind leg of a quadruped, the part that grasps the branches being composed of the *toes*, the so-called knee-joints being the heel bone of the foot, so that the whole foot reaches half way from the perch to the bird. The knee-joint is placed high up against the body, and is buried in the feathers.

As the wing presents a very broad surface to the air, it is necessary that very powerful muscles should be used to move it with sufficient rapidity. The pectoral muscles are therefore enormously developed, extending almost the whole length of the body, as every one who has carved a fowl must have seen; and in order to form an attachment for these immense muscles, the ridge of the breast-bone is equally enlarged. It is the want of these enlarged muscles that prevents man from flying, even when he has attached wings to his arms. The principal characteristics of birds are taken from their foot and beak.

The LAMMERGEYER (Germ. *Lamb's-vulture*), or BEARDED VULTURE, inhabits most mountain ranges, and is very common in the Alps of Switzerland and Germany, where, from its depredations on the kids and lambs, it has earned its name of Lammergeyer. It is not strictly a vulture, as its head and neck are feathered, and it rejects putrid flesh, unless hard pressed by hunger. It destroys hares, and young or sickly sheep and goats, nor, when rendered fierce by hunger, does it fear to attack the adult chamois, or even man. It is exceedingly bold, and shows but little fear of man. While Bruce was preparing his dinner on the



THE KING VULTURE.

summit of mountain, one of these birds, after scalding its feet in several unavailing attempts to extract some meat out of the boiling water, actually seized a piece from a platter, and went off with it.

The name of "Bearded" Vulture is given to it on account of the long tuft of hairs with which each nostril is clothed. The length of its body is about four feet, and the expanse of its wings from nine to ten. The second and third primary feathers are the longest. It lays two eggs—white, marked with brown blotches.

THE CONDOR.—These birds are distinguished by the wattles on their beaks, their naked necks, and the size of the nostrils. The third primary feather is the longest. The condor inhabits the Andes of South America, always choosing its residence on the summit of a solitary rock. This bird does not build any nest, but lays its two white eggs on the bare rock after the manner of many sea-birds. It is a very large bird, the expanse of wing being nine or ten feet, and the length of the bird about three feet. It is exceedingly strong and tenacious of life. Two condors will attack and kill the llama, or even the puma; for by their repeated buffeting and pecking they weary it so completely that it yields to their perseverance.

We now arrive at the true VULTURES. These birds are the representatives of the carrion-devouring animals, such as the hyenas, wild dogs, etc. They however do not, as the hyenas and wild dogs, attack living animals. The neck of the vulture is almost naked, very slightly sprinkled with down, and from the formation of the lower part of the neck, the bird is enabled to draw its head almost under the feathers of its shoulders, so that a hasty observer would conclude that the creature had no neck at all.

The marvellous quickness with which the vultures discover a dead animal has caused many discussions among naturalists as to

the sense employed ; some declaring entirely for sight, and others asserting that the scent of putrid animal matter leads the vultures to their prey.

The probability is that both senses are used, one aiding the other ; for in an experiment, where a dead hog was hidden under canes and briars, numbers of vultures were seen sailing in all directions over the spot, evidently directed by the scent, but unable to discover by their eyes the exact position of the animal. The olfactory nerves of the vulture are beautifully developed.

The Griffon Vulture is found in almost all parts of the old world. It is one of the largest of its group, measuring upward of four feet in length. Like most of the vultures, it does not appear to move its wings while flying, but soars on expanded pinions in large circles, apparently gaining the necessary impetus by the movements of its head and body.

Vultures are generally protected by the natives of the country where they reside, on account of their great utility in clearing away the putrid animal matter.

EAGLES.—The beak of this family is strong and curved, the feet furnished with sharp talons, and their wings are large, powerful, and slightly rounded, the fourth primary feather being the longest.

The BALD EAGLE is celebrated as being the type which has been chosen by the American people as the emblem of their nation.

The name of Bald Eagle has been applied to this bird on account of the snowy white color of the head and neck.

Its nest is generally made upon some lofty tree, and in the course of years becomes of very great size, as the bird is in the habit of laying her eggs year after year in the same nest, and making additions of fresh building materials at every fresh breeding season. She commences this task at a very early period of the year, depos-

iting her eggs in January, and hatching her young by the middle of February. It is always a very affectionate bird, tends its young as long as they are helpless and unfledged, and will not forsake them even if the tree on which they rest be enveloped in flames.

The bald eagle often takes advantage of the fishing talents of the osprey by robbing the lesser bird of its prey. The eagle is, in truth, no very great fisher, but is very fond of fish, and finds that the easiest mode of obtaining the desired dainty is to rob those who are better qualified than himself for the sport. The bald eagle is found throughout the whole of North America, and may be seen hunting the greater part of the sea-coasts, as well as the mouths of the large rivers.

The Golden Eagle is found in most parts of Europe, and is not uncommon in Great Britain. The flight of this magnificent bird is peculiarly beautiful and imposing, but its gait when on land is rather awkward, on account of its long talons.

Its food is usually sea-birds and the smaller quadrupeds, such as hares, rabbits, etc. ; but it does not hesitate to carry off young lambs, or sometimes to destroy a sickly sheep.

It generally hunts in pairs, one eagle watching from some height while the other courses along the ground, and drives the game from the bushes. The male and female remain together all the year, and very probably for life. It lays two eggs of a yellowish white color with pale brownish spots, on a nest composed of a great mass of sticks, rushes, and grass, and the young are fledged about the end of July. The eye of this bird, and of most of the birds of prey, is provided with an arrangement for enabling it to see an object near or at a great distance. It is shaded from the sun by the projecting eyebrow.

THE BUZZARD.—The family of the Buzzards are distinguished by their short beaks, large rounded wings, and squared tails. They all live on small animals, reptiles and various insects.



THE GOLDEN EAGLE.

The Common Buzzard occurs throughout most of Europe and part of Asia and America. When searching for food, it rests upon some high branch, keeping a keen watch on the ground, and waiting patiently until some small animal, such as a rat or young rabbit, makes its appearance, when it instantly sweeps down from its elevation, seizes its prey without settling on the ground, and returns, if not disturbed, to the same spot, very much in the same manner that the fly-catcher may be observed to act.

It generally builds in high trees, but has been known to make its nest among rocks. Its eggs are usually three in number, of a whitish color, spotted with pale brown, and almost devoid of the peculiar red tinge that generally characterizes the eggs of the diurnal birds of prey.

The length of this bird is from twenty to twenty-two inches ; the fourth primary feather is the longest.

The KITE, GLEDGE, or GLED, is not uncommon in America and is spread over Europe, Asia, and Northern Africa. It is especially hated by the farmer for its depredations on his poultry, and its appearance is the signal for a general outcry among the terrified poultry, who perceive it long before the keenest-eyed man can distinguish it from a casual spot in the distant sky. The sportsman also detests it for the havoc which it makes among the game.

It builds in tall trees, and lays three eggs, white, spotted with reddish brown at the larger end. Its length is rather more than two feet ; the fourth primary feather is the longest, the first and seventh nearly equal.

FALCONS.—In the genus *Falco*, the second primary feather is the longest, the first and third being of equal length. The Peregrine Falcon, an inhabitant of most parts of Europe, Asia, and South America, was in the palmy days of hawking one of the

favorite falcons chosen for that sport. Its strength and swiftness are very great, enabling it to strike down its prey with great ease ; indeed, it has been known to disable five partridges in succession. From its successful pursuit of ducks the Americans call it the Duck Hawk.

Instead of merely dashing at its prey, and grasping it with its claws, the peregrine falcon strikes its victim with its breast, and actually stuns it with the violence of the blow before seizing it with its claws.

It changes the color of its plumage several times before it arrives at full maturity, and in the days of falconry was known by different names, such as "haggard" when wild, "eyeass," "red falcon" when young, "tiercel" or "tassel-gentle" when a full-grown male. It builds on ledges of rocks, laying four eggs of a reddish brown color. Its length is from fifteen to eighteen inches.

The KESTREL frequently falls a victim to the mistaken zeal of the farmer, who takes every opportunity of destroying it, as he confounds it with the sparrow-hawk. The natural food of the kestrel is field-mice, so that the farmer should protect instead of remorselessly murdering his benefactor. These birds are not uncommon. Their nest is usually built in the deserted mansion of a crow or magpie. The eggs are four in number, of a dark reddish brown. The length is from thirteen to fifteen inches.

The SPARROW-HAWK is an inhabitant of many portions of the world and displays great pertinacity in pursuit of its prey, which it will chase for a long while, skimming along a few feet above the ground. One of these hawks was known to dash through a window in pursuit of a small bird. When taken young it is easily tamed, and will then associate with the most incongruous companions. A gentleman had a young sparrow-hawk which used to live in his dovecot among his pigeons, would accompany them in their flights, and was uneasy if separated from his strange friends.

The length of this bird is from twelve to fifteen inches. The fourth and fifth primary feathers are the longest.

It builds upon lofty trees, laying five eggs, of a whitish color blotched with variable reddish brown markings.

The SECRETARY BIRD derives its name from the tufts of feathers at the back of its head, which bear a fanciful resemblance to pens stuck behind the ear. This extraordinary bird, whose true position in ornithology has been such a stumbling-block to naturalists, inhabits South Africa. It feeds on snakes and other reptiles, of which it consumes an amazing number, and is on that account protected. When battling with a snake, it covers itself with one wing as with a shield, and with the other strikes at the reptile until it falls senseless, when a powerful blow from the beak splits the snake's head asunder, and the vanquished enemy is speedily swallowed. In the crop of a secretary bird that was dissected by Le Vaillant were found eleven large lizards, three serpents, each a yard in length, eleven small tortoises, and a great quantity of locusts and other insects. Besides these, the bird had just overcome another serpent, which would in all probability have been transferred to the same receptacle had it not been killed. The secretary is easily tamed, and is exceedingly useful. It builds on high trees, laying three eggs, almost white. Its length is about three feet.

OWLS.—A large round head, with enormous eyes looking forward, is a distinguishing mark of the owl family. Many species possess two feathery tufts placed on the head, greatly resembling horns. The owls are nocturnal birds, pursuing their prey by night, and sleeping during the day. Their eyes are enormously large, and capable of taking in every ray of light. The power of vision is also increased by the method in which the eye is fixed in a kind of bony socket, just like a watchmaker's glass. The power of hearing is also very delicate, and greatly assists them. In order to protect

them from the cold, they are furnished with a dense covering of downy feathers, which also prevents the movements of the wing from being heard by the wary mouse; and so noiseless is their flight that they seem to be borne along by the wind like a tuft of thistle-down.



THE EARED OWL.

The Barn Owl affords another instance of mistaken persecution. This beautiful and useful bird, whose carcass we so often see nailed to the barn, actually feeds upon and destroys the rats and mice which bear it company in its undeserved punishment. Few people know what a little bird this owl really is. The thick loose

plumage is so deceptive, that no one unacquainted with the structure of the bird would imagine that it is hardly so large as a pigeon. The head, too, when deprived of its feathery covering, completely loses its previous aspect, being long and narrow, like that of a hawk.

The domestic habits of the bird are very curious. When irritated or alarmed, it has a habit of snapping its beak loudly, and making a hissing sound, something like that of a cat when provoked. Indeed there is something very cat-like in the whole aspect of the owl. Its round, soft-looking face, in which are set two great eyes that shine in the dusk of the evening with an almost phosphoric gleam, and are capable of taking in every feeble ray of light, its noiseless movements in pursuit of its prey, all strongly remind the observer of the feline character.

If a mouse is given to an owl, the bird seizes it across the back, and gives it one or two smart bites, much as a terrier handles a rat. The mouse is then jerked upward and caught again head downward. A second jerk sends the mouse half down the owl's throat, while its tail remains sticking out of the side of its bill, where it is rolled about as if the owl were smoking. After some time has been spent in this amusement, another jerk causes the mouse to disappear altogether, and the owl looks very happy and contented. But if a small bird is presented to it, the owl tears it up and devours it piecemeal.

The Virginian Eared Owl is found spread over the greater portion of North America, and in former days did great damage among the poultry of the agriculturists, being a bold as well as a voracious bird. Now, however, the ever-ready rifle of the farmer has thinned its numbers greatly, and has inspired the survivors with such awe that they mostly keep clear of cultivated lands, and confine themselves to seeking after their legitimate prey.

The Virginia Horned Owl takes up its residence in the deep swampy forests, where it remains hidden during the day, and comes out at night and morning, heralding its approach with its loud, unearthly cries, as if an unquiet wandering spirit.

The nest of this bird is extremely large, and consists of a large bundle of sticks, grass, leaves, and feathers, placed in the fork of some large bough, and containing three or four white eggs.

The Night-Jar, or Goat-sucker, sometimes called the Fern Owl, is spread over Europe, and is quite common in England. It may be seen at the approach of evening, silently wheeling around the trees, capturing the nocturnal moths and beetles; then occasionally settling and uttering its jarring cry. When flying, the bird sometimes makes its wings meet over its back, and brings them together with a smart snap. It arrives in this country at the beginning of May, and leaves in December. It makes no nest, but lays two mottled eggs on the bare ground. Its length is ten inches. The Whip-poor-Will and the Chuck-Will's-Widow both belong to this family.

SWALLOWS are remarkable for their great power of wing, their wide mouths, and short legs. The whole of their plumage is constructed with a view to rapid and active motions. The feathers of their bodies are firm and close, so as not to impede their passage through the air; their wing feathers are long, stiff, and pointed, and their tails are long and forked; all which properties we know to belong to great speed.

The Common Swift is the largest and swiftest of this family. It seems to spend the whole day on the wing, wheeling with wonderful velocity, and occasionally soaring until it is hardly perceptible, but screaming so shrilly, that the sound is plainly heard. The number of insects which it destroys is almost incredible; they are retained in a kind of pouch under the tongue, and when taken

out, can hardly be pressed into a teaspoon. These are intended for the young, and the supply is constantly renewed. It lays from two to four long white eggs, on a nest composed of grass, straws, feathers, silk, etc. The color of this bird is a dusky black. The length is eight inches, the expanse of wing eighteen inches, and its weight barely *one ounce*.

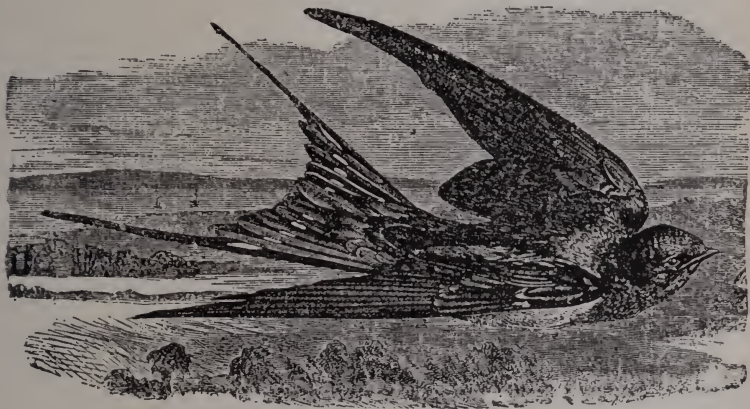
The foot of the swift is of a singular form, unlike that of any other bird. All the toes are directed forward, there being no hinder toe at all. Some naturalists say that the object of this formation is that the bird may be enabled to climb up the eaves under which its nest is made.

The Chimney Martin or Swallow is the most common of its family, and too well known to need much description. When skimming over ponds and rivers in search of insects the snap with which it closes its bill may be easily heard. In the course of its flight over the surface, it often dashes up the water with its wings, which action gives rise to the opinion that swallows passed the winter under water, and rose in the spring. It is so eager after its prey, that it may be easily caught with a rod and line baited with a fly.

It breeds twice in the year, building a nest of mud against a wall or other convenient situation, and laying five very pale pink eggs, spotted with reddish brown. The bird appears regularly to return, year by year, to its old nest. The whole of its upper surface is a deep purplish black, its forehead and throat chestnut. Humboldt, in his "Travels," relates that he saw a swallow perch on the rigging of the vessel when it was one hundred and twenty miles from the land.

The Sand Martin is the smallest of our American swallows, but makes its appearance before any of its brethren. It principally builds in cliffs of sandstone, boring holes three feet or more in depth,

and often winding in their course, most probably to avoid a casual stone or spot too hard for its bill, which, although small and unfitted for the task, makes its way through the sandstone with extraordinary rapidity. Where a convenient sand-cliff exists, hundreds of these pretty little birds may be seen working away at their habitations, or dashing about in the air, looking at a distance like white butterflies, and occasionally returning to the rock, which is often completely honeycombed by their labors.



THE SWALLOW.

The House Martin reaches the States shortly after the swallow, and almost invariably takes possession of its old nest, which it repairs about May. It lays five eggs closely resembling the sand martin. About September, immense numbers may be seen perched upon houses and trees preparatory to their departure.

The Esculent Swallow, whose nests are considered such a delicacy among the Chinese, builds its singular habitation in the

sides of almost inaccessible cliffs, so that the business of procuring them is a most dangerous task.

The nests are harried about three times in every year, and it is said that the natives who are employed in procuring them are careful to destroy the old and deep-colored nests, in order to force the birds to build new habitations, which command a high price in the market. The nests are chiefly found in Java.

THE TROGON.—The magnificent family of the trogons stands pre-eminent in beauty and brilliancy of plumage, the usual tint being a metallic golden green, boldly contrasted with scarlet, black, and brown. The toes are placed two behind and two before, like those of the woodpeckers.

The Resplendent Trogon is the most gorgeous of all this gorgeous family. Its long and gracefully curved tail, nearly three feet long, the whole of the upper surface, and the throat, are a glowing green; the breast and underparts are bright crimson; the middle feathers of the tail black, and the outer feathers white. This splendid bird is an inhabitant of Mexico, and was used by the Mexican nobles as an ornament to their head-dress.

From the feathers of these and other trogons the mosaic pictures of the Mexicans were made. This is a very difficult bird to stuff, on account of the delicate texture of the skin, which is so fragile that it tears about as easily as wet blotting-paper.

The KINGFISHER is found in most parts of England and America. Scarcely anything more beautiful can be conceived than the metallic glitter of its plumage as it shoots along the banks of the river, or darts into the water after its struggling prey. Its usual method of fishing is by placing itself on a stump or stone overhanging the water, from which spot it watches for the unsuspecting fish beneath. After a fish is caught, the bird kills it by beating it several times against its resting-place, and then swallowing it, head foremost.

It lays its eggs in holes in the banks of rivers or ponds, and appears to build no nest. A pair of kingfishers, for two successive years, inhabited a bank of a very small stream, little more than a drain, at Little Hinton, Wiltshire, where no fish lived, nor were there any to be found within a considerable distance. The eggs are from four to seven in number, of a pearly whiteness, and remarkably globular in shape.



THE KINGFISHER.

The HOOPOE, one of the most elegant birds that visit this country, is unfortunately a very rare guest, and seldom, if ever, breeds here. Its beautiful crest can be raised or depressed at pleasure, but is seldom displayed unless the bird is excited from some cause. Its food consists of insects, which it first batters and moulds into an oblong mass, and then swallows, with a peculiar jerk of the head.

In France, hoopoes are very common, and may be seen examining old and rotten stumps for the insects that invariably congregate in such places. There they may be seen in flocks, but they never seem to come over to England in greater numbers than one pair at a time. M. Bechstein gives a curious account of the attitude assumed by the hoopoe on perceiving a large bird in the air. "As soon as they perceived a raven, or even a pigeon, they were on their bellies in the twinkling of an eye, their wings stretched out by the side of the head, so that the large quill feathers touched the head, leaning on the back with the bill pointing upward. In this curious posture they might be taken for an old rag!" The hoopoe lays from four to seven gray eggs in the hollow of a tree. Its length is one foot.

THE HUMMING-BIRD.—These little living gems are exclusively found in America, especially about the tropical parts, becoming gradually scarcer as we recede from the tropics in either direction. Only two species are known to exist in the northern parts, but in the central portions and in the islands about Florida they absolutely swarm. They glance about in the sunshine, looking like streaks of brilliant light; and so rapid is the vibration of their fine and elastic wings that, when hovering over a flower, a humming or buzzing sound is produced, from which peculiarity the name of humming-bird has been given them in almost every language.

Waterton's description of the appearance of the humming-bird in the sun is very characteristic: "Though least in size, the glittering mantle of the humming-bird entitles it to the first place in the list of the birds of the New World. It may truly be called the Bird of Paradise; and had it existed in the Old World, it would have claimed the title instead of the bird which now has the honor to bear it. See it darting through the air almost as quick as thought! Now it is within a yard of your face—in an instant gone—now it flutters from



THE RUBY-THROATED HUMMING-BIRD.

THE AVOCET HUMMING-BIRD.

flower to flower to sip the silver dew—it is now a ruby—now a topaz—now an emerald—now all burnished gold.”

The tongue of the humming-bird is formed much like that of the woodpecker, being curled round the head, under the skin, and thus capable of being darted to a considerable distance.

Like many other little creatures, the humming-bird is remarkable for its assurance and impudence. It is easily tamed for that very reason, and has been known to domesticate itself in an hour from the time of its capture, and even when released, it has returned again to partake of the dainties which it had tasted during its captivity. There are an immense number of species of these exquisite birds varying from the size of a swift to that of a humble bee. The nests are very neat and beautiful, and as may be imagined from the diminutive size of the little architect exceedingly small. They are composed of down, cotton, etc., and are sometimes covered on the outside with mosses and lichens.

The CREEPERS are remarkable for their long, slender bills and claws adapted for climbing trees and capturing insects. The common creeper may often be seen in this country, running spirally up the trunks of trees, and probing the bark with its bill; and so firmly do the claws hold, that, when shot, it does not always fall, but remains clinging to the tree. The nest of this elegant little bird is made in a decayed tree. The eggs are from seven to nine in number, gray, with dusky spots.

The WREN shares with the robin some immunity from juvenile sportsmen. Although it may be fearlessly hopping about in the hedge, jerking its funny little tail, and playing its antics just at the muzzle of the gun, few boys will fire at it—a privilege for which it is difficult to give a reason, except, perhaps, the very incomprehensible assertion that “the robin and the wren have divine protection,” although why these two birds, both proverbially quarrel-

some and pugnacious, should be selected, to the exclusion of others, is difficult to say. Perhaps the robin enjoys his immunity from the “Babes in the Wood,” and the wren makes a convenient rhyme.

The nest of the wren is built in any convenient cranny; an ivy-covered tree, the thatch of a barn, or a warm scarecrow, are all used by this fearless little bird. The nest is usually of an oven-like shape, always covered on the outside with some material resembling the color of the objects round it, such as green moss if built among ivy, or brown lichen if built on a rock or in the fork of a withered branch. The eggs are six or eight in number—white, speckled with reddish brown.

THE NIGHTINGALE.—The marvellous notes of the Nightingale sound comparatively weak unless backed by the accompaniments of night and tranquillity; for the inimitable song of this Mendelssohn among birds loses great part of its beauty when uttered by day, deadened and confused with other sounds. There are some people who cannot appreciate the song of this bird. There is a story that a man who was engaged as gardener in a gentleman's family was permitted to live within the grounds. In a short time he asked to be allowed to change his house, and on being asked his reason for giving up so good a situation, answered that he could get no sleep at night, because those nasty nightingales kept up such a continual guggling.

In some counties of England it is never found, but in many its nightly strains are frequently heard. It must be borne in mind that not only in this bird, but in other singing-birds, the male is the vocalist.

The WARBLERS are spread over almost the entire globe, and many gladden this country with their pleasant songs. The BLACK-CAP, almost a rival to the nightingale, is at once recognized by the black color of the crown of the head. Only the males, however,

are thus decorated, the crown of the head of the female being dark brown. Its sweet notes are poured forth from the concealment of some thicket or tuft of trees, where it trusts to the density of the foliage to elude discovery. Like the mocking-bird of America, it can imitate the songs of other birds with such perfect inflection that it is almost impossible to detect the imposture. Among bushes and brambles it builds its nest, which is made of dried grass, moss, and hairs. The eggs are five in number—reddish brown, marked with dark spots. The length of the bird is nearly six inches; the third primary feather is the longest.

The GOLDEN-CRESTED REGULUS is one of the smallest of birds. Fir plantations are its favorite resort, and there it may be seen hopping about the branches, or running round them, head downward, in search of the insects hidden beneath the bark. Its name is derived from the orange-colored tuft of feathers on the crown of its head, for which reason it is often called the Kinglet. Its note is weak, but very pleasing, and much resembles that of the common wren. The female is very bold while sitting, and will permit close observation without quitting the nest. The nest itself is an object of great beauty. It is usually placed on the under side of a fir branch, sheltered by the overhanging foliage, and sometimes further protected by a large bunch of cones forming a kind of roof over it. The eggs are from six to ten in number, very small, and of a reddish white color. The length of the bird is three inches and a half. The fourth or fifth primary feather is the longest.

The REDBREAST or ROBIN REDBREAST, as it is affectionately termed, has, by its fearless conduct, earned itself golden opinions from all kinds of men. Every nation seems to protect it. Even the American redbreast lives unharmed possibly on account of its connection with its English relation, whose oft-told charity toward the Babes in the Wood has turned aside from its posterity even the unsparing hand of the sporting schoolboy.

In the winter, when the berries are gone, insects dead, and the worms hidden under the hard frozen soil, then the robin flies for refuge to the habitations of man for shelter and food. It is very amusing to see the half-trusting, half-fearful look with which it hops to the window-sill for the first time. After a while, it becomes bold, and taps at the window, if the expected crumbs are not thrown out. Before long, it ventures to enter the room, hops about on the table, and quite seems to consider as a right what was first merely a favor. When once established, it is very jealous, and will not suffer a friend to be a partaker of the same comforts, but attacks him with the greatest fury; so the unfortunate second comer has to wait shivering outside the window, with his feathers puffed up, and his little bright eye glancing from the depths of his plumage.

The nest of this bird is built in a crevice of an old ivied wall, in a bank, sheltered by the roots of trees, or in a mass of ivy clinging to an old tree. The eggs are five in number, of a pale gray color, profusely marked with reddish spots.

THE TITS.—The birds of this family are remarkable for their active habits among the branches of trees. There are few who have not seen these beautiful and interesting little birds twisting round the branches, perfectly unconcerned at the presence of the spectator, sometimes hanging head downward, sometimes chasing an unlucky beetle along the bark, and invariably catching it, in spite of its swift limbs and active wings; sometimes twisting off a bud, and pulling it to pieces with marvellous rapidity, in order to secure the lurking caterpillar within; sometimes pecking away at a piece of loose bark, and extracting an unwilling spider by one of its legs left incautiously projecting from its lurking-place.

The little BLUE TITMOUSE is so well known as hardly to require any description. It is most amusingly courageous, and from the strenuous resistance it offers to its capturer, has acquired from

rustic boys the name of "Billy-biter." The angry hiss of the female has frequently caused an intruding hand to be rapidly withdrawn, for the sound is so exceedingly like the hiss of an irritated snake, and the little beak is so sharp, that few have the courage to proceed with their investigations. A pair of these birds built their nest in the coping of the Great Western Railway, at the Shrivenham station, not two feet from the fiery and noisy engines, which were constantly passing. The men respected the courage of the little birds, and this whole brood was hatched, and suffered to fly at liberty.

The utter contempt which this bird entertains for fire-arms often leads to its destruction, for when the disappointed schoolboy has been wasting his powder and shot in attempting to hit larks and such large game, he consoles himself by shooting the unfortunate titmouse, who will allow him to come so close that few vestiges of it remain except a tuft of blue feathers. The eggs of the blue titmouse are from six to eight in number—white, marked with reddish brown spots. Its length is about four inches and a half.

THE PIED WAGTAIL.—The wagtails, so named, from the almost incessant vibration of their tails, are exclusively confined to the Old World. The pied wagtail is the most common of its race. We often see it pass rapidly, with peculiar dipping flight; it settles on the ground and wags its tail; it runs a few paces, and wags its tail again; pecks at an insect, and its tail again vibrates. It does not hop, like the warblers, finches, etc., but runs with great rapidity, and altogether looks very like a diminutive magpie.

Sand-banks by the sides of rivers are the usual resort of these birds, where they may almost always be seen, running about by the water's edge, sometimes snatching at an incautious May-fly, sometimes wading into the water after a caddis-worm or a stray grub, or pecking at an unfortunate little minnow, which has come too near



THE BRITISH WAGTAILS.

the surface—and then it flies off to another spot to repeat the same manoeuvres. It also greatly frequents pastures, and may be seen running about among the cows in the most nonchalant manner imaginable, catching the flies that torment those animals in the summer, or flying off to its unfinished nest with a beak full of hairs.

Their nests are built near the water, in crevices among stones, or in the hole of a wall. Frequently when stones are piled by a wet quarry, several nests may be found in one heap of stones. The eggs are four or five in number, of a dusky white color, spotted with ashy brown. The length of the bird is seven inches and a half.

The WATER OUZEL, or DIPPER is found principally in hilly places where there are clear and rapid streams. There it may be seen to go through its far-famed movements under the water, which have given rise to so much controversy. It dives for considerable distances with apparent ease, and has a habit of dipping and rising repeatedly, from which practice its name has been derived. The nest is usually built by the water-side, and is most carefully concealed. In general appearance it is not unlike that of the wren, being made of intertwined mosses, with an entrance at the side. It lays five large white eggs. The length of this bird is about seven inches.

The SONG-THRUSH, THROSTLE, or MAVIS, is deservedly considered one of our best singing-birds. Its powerful and rich notes may be heard even during the month of January, when most of the other singing birds are either silent, or have departed.

Its nest is built almost before any other bird has commenced, and may often be seen conspicuously placed in a bush, some time before the leaves have begun to sprout. In order to defend the callow young from the cold winds of the season when they are hatched, the nest is more substantial than birds are accustomed to

build, being thickly plastered within with a coating of mud, effectually keeping out the chilly blasts. Were it only for its singing powers, the thrush would deserve protection; but the services it renders to the gardener in devouring insects, snails, and other destructive creatures, entitle it to a double share of regard.

It is very amusing to watch a thrush listening for the sound of the earth-worm working its way through the ground, or the gnawing teeth of the cockchaffer grub. The grub he unearths and devours without further ceremony, but he knows that if he is not cautious, the earth-worm will withdraw itself out of his reach. He therefore gives several hops near the worm, which, fancying that it hears its enemy the mole pursuing it, comes to the surface, and is instantly seized in triumph by the crafty thrush.

It clears the shells from snails by beating them against a stone, and when it has found a convenient place for that purpose, it invariably returns to the same spot with its prey, so that heaps of broken snail-shells may often be found where the thrushes have been at work.

The eggs of the thrush are five in number, of a bluish-green color, spotted with a deep reddish brown. Sometimes the spots are altogether absent.

The BLACKBIRD is another delightful songster, whose jetty hue and "orange-tawny bill" are too well known to need description. It is a very shy bird, and if disturbed in a hedge, has a habit of darting through it, and then escaping on the other side, uttering a sharp cry of alarm.

The habits of this bird are not unlike those of the thrush, especially in its zeal for unearthing the cockchaffer grubs, and possibly for eating cherries when they are ripe. Its nest is built usually at the foot of a hedge, frequently in the very centre of a holly bush, safe from most enemies, except weasels and schoolboys.

The eggs are five in number, of a bluish-green color, profusely spotted with brown.

The MOCKING-BIRD is a native of most parts of America. This wonderful bird stands pre-eminent in powers of song. Not only are its natural notes bold and spirited, but it has the faculty of imitating with deceptive fidelity every sound it hears. To its flexible organs, the harsh setting of a saw, the song of a nightingale, the creaking of a wheel, the whistled tune of a passer-by, the full and mellow notes of the thrush, the barking of a dog, the crowing of a cock, and the savage scream of the bald eagle, are each equally easy of execution, and follow one another with such marvellous rapidity that few can believe that the insignificant brown bird before them is the sole author of these varied sounds. The Virginian nightingale and the canary hear their exquisite modulations performed with such superior execution, that the vanquished songsters are silent for mere mortification, while the triumphant mocking-bird only redoubles its efforts.

Wilson, whose animated description of this bird has never been surpassed, says: "His expanded wings and tail glistening with white, and the buoyant gayety of his action arresting the eye, as his song does most irresistibly the ear, he sweeps round with enthusiastic ecstasy, and mounts and descends as his song swells or dies away. He often deceives the sportsman, and sends him in search of birds that are not perhaps within miles of him, but whose notes he exactly imitates; even birds themselves are frequently imposed upon by this admirable music, and are decoyed by the fancied calls of their mates, or dive with precipitation into the depth of thickets at the scream of what they suppose to be the sparrow-hawk.

While sitting on its eggs it is an exceedingly courageous bird, attacking without discrimination man, dog, or any animal who

may approach too near to the nest. But the black snake is the special object of its vengeance. The snake, who has perhaps just arrived at the vicinity of the nest, and is contemplating a pleasant breakfast on the young or eggs, is violently attacked by the enraged mocking-bird, who, by repeated blows on the head, generally destroys its enemy, and then, mounting on a bush, pours forth a triumphant song of victory.

The nest is made generally in a bush or apple-tree, frequently close to houses, as the bird is protected by the inhabitants. The mocking-bird is often kept tame, in which case, so far from its imitative powers showing any decrease, the variety of domestic sounds heard about the house is often very perplexing.

The SPOTTED FLYCATCHER, an inhabitant of America, may be considered as the type of the entire family. It may be constantly seen in the gardens and orchards, going through the evolutions that have given it the names of Flycatcher, Post-bird, Beam-bird, etc. It takes its station on some elevated spot, such as the overhanging bough of a tree, a post, or a rail; and from thence watches for a passing insect, on seeing which, it darts from its post, secures the insect in the air, and returns to the spot by a short circular flight. It is not a timid bird, and will permit an observer to stand quite close to it, provided that he does not disturb it.

Its note is a weak chirp, and even that is not often heard. The nest is built usually in holes of trees or walls, or sometimes between a branch of a wall-fruit tree and the wall itself. The eggs are five in number, spotted with reddish brown on a gray ground. The length of the bird is about five inches.

The SHRIKES, or BUTCHER BIRDS, well deserve their name, as they live upon insects and small birds, which they kill, and afterward transfix with a thorn, preparatory to devouring them. They take their prey much after the same manner as the flycatchers, by darting on it from some place of concealment.

The Great Gray Shrike feeds upon mice, birds, frogs, and other small animals. After pouncing upon its prey, the shrike, by a few blows on the head from its powerful bill destroys it. The unfortunate animal is then carried to the nearest hedge, impaled, on a thorn, and the shrike devours it at his leisure. Large insects are treated in the same manner. The object of this impalement is apparently that the creature thus suspended should become tender or "high," and after hanging a lizard or mouse in this fashion, the bird generally goes off and fetches another, always preferring to eat those which have remained longest on the thorn, and which are, as it were, cooked in the sun.

There is a strong bodily resemblance between this shrike and the mocking-bird, the distinction lying generally in the outline; while the plumage is so similar, that many persons have actually confused the two birds, giving to one the habits of the other. Moreover, the resemblance is not merely in outward form; the gray shrike can also imitate the notes of other birds, and often does so.

The name Execubiter, or Sentinel, is given it from the habit of watching for birds of prey, and chattering loudly directly it perceives them, thereby, proving that, like most other tyrants, it has a great objection to suffering any injury itself. The nest is built on trees, and contains about six eggs, grayish-white, spotted with dark ash on the larger end; length of the bird is from nine to ten inches.

The JAY, so well known for the beautiful blue markings on its wings, is rather a shy bird, preferring to reside in the thickest woods, and seldom coming into the open country. It is easily tamed when young, and is very amusing when domesticated.

This bird possesses, like several others of the same family, considerable talents for mimicry. It has been known to imitate the sound of a saw, the bleat of a lamb, or even the neighing of a horse,



THE MAGPIE.

with the most perfect accuracy. Nor do its powers cease here, for although its natural voice is harsh and grating, yet it can imitate the sweet notes of singing birds, such as a greenfinch, with wonderful fidelity. It has also frequently been taught to articulate words.

The name of *Glandarius* has been given to the jay, because it feeds on vegetable productions, such as acorns, etc., more than the true crows. It is also partial to fruits, especially ripe cherries, and is consequently persecuted by the gardener. It is also said to devour eggs and young birds.

Its nest is built about twenty feet from the ground, the upper part of a thick bush being preferred. The eggs are five or six in number, of a yellowish white, thickly speckled with brown. The length of the bird is nearly fourteen inches.

The MAGPIE, who seems to rival the parrot in the proud title of the monkey of the birds (the raven being the ornithological baboon), is a well-known inhabitant of this country. Its thieving and hiding propensities have been frequently told; but I must still venture to give a few anecdotes of a tame magpie that resided in Wiltshire. This bird found a malicious enjoyment in pecking the unprotected ankles of little boys not yet arrived at manly habiliments, and was such a terror to the female servants that they were forced to pass his lurking-place armed with a broom. One of the servants having neglected this precaution, was actually found sitting down on the stones to protect her ankles, the magpie triumphantly pacing round her, until aid was brought, and the bird driven away. But to little boys and girls the magpie showed no mercy, springing out of its hiding-place and chasing them completely along the garden walk.

The nest of the magpie is built on a high tree, and curiously defended with thorns, having a small hole just large enough to admit the owners, so that the liberal use of a pocket-knife is fre-

quently requisite in order to obtain the eggs. The nest is covered with a dome of thorns, and its interior is defended by a coating of mud, worked smooth. The eggs are five in number, of a greenish white, covered with brown markings. The length of the bird is about eighteen inches.

The RAVEN is very common in parts of Europe, and some parts of Asia and America. It is more frequently found in the Hebrides than in any other part of Great Britain. In those islands it lives principally on carrion of various kinds, such as a dead sheep or lamb, whose death the raven is accused with some justice in hastening, and on fishes or cetaceous animals which have been cast on shore by the waves.

In these cases the raven conducts itself much in the manner of the vulture. It commences by taking out the eye and tongue, and then proceeds to tear open the abdomen, operations for which its sharp and powerful bill seems quite as well fitted as the hooked beak of that rapacious bird. It is a very crafty bird, and can with difficulty be approached; but by laying a dead carcass near its haunts, and being carefully concealed, it may be seen cautiously approaching; first, perching on an eminence, it looks carefully round; then advancing with a sidelong step, it examines its expected prey. When fully satisfied, it pecks out the eyes, and proceeds to satiate itself with food. The raven seems to revel in storms, and to be deterred by no inclemency of weather from seeking its prey.

Although formerly so plentiful in America that innumerable omens were drawn from its appearance, its croaking, or its flight, it has almost become extinct, much to the discomfiture of omen-seekers.

A raven in our possession used to watch the gardener taking particular pains to prop up and secure a valuable plant. His

labor was always in vain, for the raven, with a sidelong step and an unconcerned air, as if he were thinking of anything but the plant, would sidle by it, when one wrench of his iron bill laid the unfortunate plant on the earth, and the raven moved off with the most provoking air of innocence. The lady to whom the garden belonged was quite afraid of the bird, and declared that she almost believed that it was possessed by some evil spirit. It used to walk behind her, so that she could never see it; for when she turned round, the raven hopped round too, and kept himself completely out of her sight. At last it became so very mischievous that it was sent away.

It has a great capacity for imitating sounds, and can be taught to pronounce whole sentences, or sing songs with wonderful accuracy.

In the northern parts of Scotland it makes its nest on high rocks, but not unfrequently builds on the summit of a tall tree. The nest is a large irregular structure of heath, grass, wool, and feathers, and sea-weed, if it builds near the sea-shore. It lays from four to seven eggs, of a pale green color, spotted with greenish brown. The length of the bird is two feet two inches, and the expanse of wing four feet eight inches.

The Rook inhabits almost every part of Europe, and is very common in England, where it lives in a kind of semi-domestication, inhabiting a grove of trees near a house, or in a park, where it is protected by the owner, although he makes it pay for this accommodation by shooting the young ones every year. Apparently in consequence of this annual persecution, the rook has an intense horror of guns, perceiving them at a great distance. While feeding in flocks in the fields, or following the ploughman in his course, and devouring the worms and grubs turned up by the share, the rook has always a sentinel planted in a neighboring tree, who instantly gives the alarm at the sight of a gun, or other suspicious-looking object.

The good which the rook does by devouring the grubs of the cockchafer, and the tipulis, or daddy-long-legs, both of which are exceedingly injurious to the crops, more than compensates for the damage it sometimes causes by pulling up young corn, or newly set potato cuttings; in the latter case more, I believe, to get at the wireworms, which crowd to slices of potato, than to eat the vegetable itself.

In the fruit season, the rook, like most other birds, likes to have his share of the cherries, pears, and walnuts, but may be easily kept away by the occasional sight of a gun. Toward evening, the rooks may be seen flying in long lines to their resting-place. They then perform sundry evolutions in the air, and finally settle to rest.

Round the base of the rook's beak is a whitish-looking skin, denuded of feathers, the reason or cause of which is not plain. A white variety of rook is sometimes seen. The eggs of the bird are five in number, similar to those of the raven in color, but much smaller. The length of the bird is nineteen inches.

The JACKDAW is another well-known bird. It does not build in the branches of trees like the rook, to which it is very similar in many respects, but prefers holes in decayed trees or old buildings, particularly frequenting church towers and steeples. The jackdaw feeds upon almost any substance that it can find. It kills mice with a single blow of its beak, and then devours them piecemeal. Grasshoppers, beetles, etc., are also killed by a squeeze across the thorax, and the head, wings, and legs are twisted off before the bird begins to eat them. It treats bees, wasps, and other stinging insects with much more caution.

The feathers upon the crown of its head are of a grayish white color, a peculiarity instantly distinguishing it from the rook. It is frequently kept tame and is very amusing in captivity. The eggs are of a lighter color than those of the rook, smaller and more sparingly spotted. The length of the bird is fourteen inches.

The CROW, or CARRION CROW, as it is erroneously called, seldom feeds on carrion ; for poor indeed would be his meals were he dependent on dead sheep or horses for a livelihood. Possibly the name was given as a distinction between it and the rook. Waterton states that the flesh of the carrion crow is just as good as that of the rook, and relates how he once served up a pie of these birds to some friends, who thought them pigeons.

It will also eat cherries and walnuts like the rook, and when the supply of insects has failed, it will then turn its attention to the duck-pond and farm-yard, and carry off a young duckling or chicken. It also carries off eggs, by pouncing upon them, and driving its bill through the shell, and even mice and rats are not unaccustomed food. The nests of this bird are placed on the summit of some tall tree, and contain about five eggs, closely resembling those of the rook. The length of the bird is eighteen inches.

The CHOUGH is rather larger than the jackdaw, and is principally distinguished by the red hue of its bill and legs. It inhabits the counties of the western coast of England. When tame, it shows a very inquisitive disposition, examining every novelty with the greatest attention. It builds its nest in the cavities of high cliffs, and lays four or five eggs of a yellowish white color, spotted with light brown. The length of the bird is seventeen inches.

THE EMERALD BIRD OF PARADISE.—This most gorgeous and elegant bird was once the subject of much discussion between naturalists. The natives of New Guinea were accustomed to dry them, having first cut off their legs, and then to offer them for sale. In this footless state they reached Europe, where it was universally stated that the bird lived always in the air, buoyed up by the lightness of its feathery covering ; that the shoulders were used as its nest ; that the only rest it took was by suspending itself from a



THE EMERALD BIRD OF PARADISE.

branch by the filamentary feathers of the tail ; that its food was the morning dew ; together with many other conjectures not less ingenious than amusing.

This bird is about the size of a jay. Its body, breast, and lower parts are of a deep rich brown ; the front set close with black feathers shot with green ; the throat is of a rich golden green ; the head yellow ; the sides of the tail are clothed with a splendid plume of long downy feathers, of a soft yellow color. By these are placed two long filamentous shafts, which extend nearly two feet in length.

Of these beautiful feathers the bird is so proud that it will not suffer the least speck of dirt to remain upon them, and it is constantly examining its plumage to see that there are no spots on it. When in its wild state, it always flies and sits with its face to the wind, lest its elegant filmy plumes should be disarranged.

The STARLINGS comprise many genera, among which the Pensile Orioles of America are the most interesting. These birds build, or rather weave, a fabric not unlike loose cloth, composed of hemp or flax. This nest is of the singular form represented in many engravings, and the entrance is at the side. In all probability this singular formation is for the purpose of keeping out the black snake, who is constantly on the look-out for young birds. The parent orioles often attack the snake, and compel him to retreat.

The plumage of the male when full grown is very brilliant. The head, throat, and back are black, the under parts are orange, the breast vermilion. A band of orange passes over the shoulders, and the tail is orange and black. The length of the bird is almost eight inches.

This is not the only bird that constructs pensile nests ; the Weaver Birds also form these nests, but of a different form. They look like great pistols hung up by the butt, the entrance being at the muzzle, and the nest in the butt.



The common starling is a bird well known both for its beauty and its singular method of flight. When a flock of starlings begin to settle for the night, they wheel round the place selected with great accuracy. Suddenly, as if by word of command, the whole flock turn their sides to the spectator, and with a great whirring of wings, the whole front and shape of the flock is altered. No body of soldiers could be better wheeled or countermarched than are these flocks of starlings.

The starling lives principally among old buildings, and is very fond of gaining admittance into dovecotes, where it is a harmless visitor, and may be suffered to remain without detriment to the pigeons or their eggs.

Its nest is made usually in a hole in a wall, sometimes in a decayed tree, and contains five eggs of a very delicate uniformly pale blue. There is never any difficulty in discovering the nest of the starling, for if it builds in a hole of a wall it generally leaves several straws sticking out, as if to indicate the locality; and when it goes to take food to its young, both parent and children set up such an outcry that it may be heard a long way off. Consequently, there are few eggs so prevalent in the string of the country boy as those of the starling.

THE GROSBEAK OR HAWFINCH.—We now arrive at the FINCHES—a very numerous and interesting family. None of the species are large, and most of them are excellent songsters. Their beaks are conical, and fitted for the destruction of corn, peas, etc.

The grosbeak, or hawfinch, well deserves its generic name of “Berry-breaker,” for its beak is capable of breaking the hard kernels of the cherry, and, according to Willoughby, even those of the olive. It is not a very rare bird, although it is but seldom seen. This fact is accounted for by its great shyness and dread of mankind; so that, although it remains in some sections throughout

the year, it seldom ventures out of the thick woods in which it delights to dwell.

The nest of this bird is very shallow, and slightly put together, being hardly superior to that of the wood-pigeon. The eggs are from four to six in number, of a greenish white, covered with dark marks and spots. The length of the grosbeak is seven inches.

The CHAFFINCH, or PIEFINCH, as it is often called, is so well known as to need no description. It is chiefly remarkable for the beautiful nest which it constructs. The forks of a thorn or wild crab-tree are favorite places for the nest, which is composed of mosses, hair, wool, and feathers, covered on the exterior with lichens and mosses, so exactly resembling the bough on which the nest is placed that the eye is often deceived by its appearance.

In the nest four or five very pretty eggs are laid; these are of a reddish-brown color, sparsely marked with deep brown spots, especially toward the larger end. The name *Cœlebs*, or Bachelor, is given to this bird, because the females quit this section about November, leaving large flocks of males behind them.

The GOLDFINCH, or THISTLEFINCH, so called on account of its fondness for the down of the thistle, is one of our most beautiful birds. Where thistles abound small flocks of goldfinches may be seen flying from hedge to hedge, and occasionally pecking the white tops of the thistles. The tufted seed of the dandelion, groundsel, and other plants is also eaten by the goldfinch. In captivity it is very tame, and can be trained to perform a multitude of tricks, the most common of which are drawing its own food and water with a chain and bucket, or firing a gun when commanded.

The nest is very beautiful, being mostly made of wool and down from various plants, and is usually placed on the extremity

of a spray. The eggs are small, of a whitish tint, spotted with orange brown.

THE COMMON LINNET frequents commons and neglected pastures. Its song is very sweet, and many bird-fanciers suppose that the mixed breed of a canary and a linnet has a sweeter song than either bird. Its nest is usually built in the centre of a large and dense bush. The eggs are five in number, grayish-white speckled with red.

THE CANARY.—This pretty little songster is so well known as to need but little description, particularly as there are no opportunities of studying its natural course of life. From the manner in which the canary is usually reared, it is evident that the bird has but very little opportunity of exhibiting its natural instincts.

THE SPARROW.—The courageous, impudent, quarrelsome sparrow is known to all, and, therefore, will not be particularly described. There are few who have not seen this little bird, when pressed by cold in the winter, come to the window, expecting his donation of crumbs. It is very fond of grain of various kinds, and does some damage to the farmer, but the destruction of caterpillars by the bird more than compensates for the loss of the grain. The little impertinent bird has no scruple in perching on the pig's trough, and partaking of his dinner, or in mixing with fowl and taking its share of their provisions ; and on a newly-thatched house it absolutely revels. Dozens of sparrows may then be seen pecking and pulling at the straws in high enjoyment. The nest of the house sparrow is usually built in holes of roofs. The eggs are speckled black and white.

THE YELLOW-HAMMER, or YELLOW BUNTING, is a very delicately marked little bird, very common in our hedges, where it flits before the traveller, always keeping about twenty yards in front. It make its nest on the ground, and lays five eggs curiously scrib-

bled over with dark chocolate lines, just as if a child had been trying to write Arabic on the eggs.

The LARKS are known by their very long hind toe. The skylark, which pours forth its animated song while suspended high in the air, is an inhabitant of most parts of Europe, Asia, and North Africa, but is not found in America. A very interesting story is told of a skylark that was brought out to this country by a poor emigrant, and which used to collect crowds of delighted listeners round its cage. An English settler, who happened to be passing by while the bird was singing, was so affected by the reminiscences which its song called up that he offered his horse and cart for the bird, on the spot. The owner, however, would take no price for it, although most extravagant offers were made, and kept it till his death. The bird afterward passed into other hands, but refused to sing until its cage was hung up in the open air.

The nest is made on the ground, frequently in the print of a horse's foot, and contains five eggs of a greenish-white, thickly spotted with brown. There are generally two broods in the year; one in May, and the other in July or August. Immense numbers of these birds are caught annually and sent to the London markets. The mode of catching the larks is generally by means of a number of horsehair nooses attached to a long line. Food is scattered among the nooses, and the larks in reaching the food get their limbs entangled in the horsehair, and either strangle themselves, or are held until the fowler comes to take them out.

The BULLFINCH affords a singular instance of the power of art on the song of birds. The natural note of the bulfinch is low, and can only be heard at a short distance; but when well trained the bird whistles, or "pipes," as it is called, any melody which had been taught it, in a fine flute-like tone. A good piping bullfinch sells at a very high price. The method of teaching is to

confine the birds in a dark room, and, before their food is given to play the air that they have to learn, on an instrument called a bird-organ. The birds soon begin to imitate the notes, and by degrees the whole tune is learned. Some trainers substitute a small clarinet for the bird-organ. When in captivity the bullfinch is very sociable, and soon learns to know its owners, and to come to them when called.

The nest of this bird is made in thick bushes, or fir-trees. The eggs are of a pale-greenish white, spotted with orange brown. The name of bullfinch is given to it on account of the large proportionate size of its head and neck. When in captivity, its plumage sometimes turns black, the result of feeding it too profusely with hemp-seed.

THE RHINOCEROS HORNBILL.—This singular and almost startling family comprises but few species, which are all natives of India and Africa. The enormous bill, with its incomprehensible appendage, although heavy, is really much lighter than it looks; being composed of a kind of light honeycombed structure. The upper protuberance is hollow, and the only conjecture formed of its use is that it serves as a sounding-board to increase the reverberations of the air while the bird is uttering its peculiar roaring cry. In spite of the apparently unwieldy bill, the bird is very active, and hops about the branches of the trees with much ease. The appendage to the upper mandible is small when the bird is young, and only attains its enormous size when the hornbill has reached its full growth.

The bill of the hoopoe presents a somewhat analogous peculiarity, as when the bird is young the bill is short and pointed, and increases with the size of the bird. From this circumstance, together with some other resemblances, some naturalists imagine that there is an affinity between the hornbills and hoopoes.

The hornbills seem to be omnivorous, fruits, eggs, birds, reptiles, etc., forming their food. The African hornbills are extremely fond of nutmegs, and are, on that account, said to be peculiarly delicate eating. The rhinoceros hornbill is a native of India and the Indian islands. The length of its bill is usually about ten inches.

The CLIMBING BIRDS, now engage our attention. Under this order are placed the Toucans, Parrots, Woodpeckers and Cuckoos. The feet of these birds have two toes in front and two behind. The toucans are all natives of tropical America. Their enormous bill is rendered light in the same way as that of the hornbills, by being chiefly composed of a honeycomb structure. It seems to be very sensitive, and well supplied with nerves, as the bird not only appears to enjoy holding meat or fruits with the tip of its bill, but has been seen to scratch that organ with its foot, plainly proving that there must be sensation.

It seems to be omnivorous, but is particularly fond of mice and small birds, which it kills by a powerful squeeze, then strips and finally pulls to pieces and devours, having previously reduced them to a shapeless mass by repeated lateral wrenches with its enormous and saw-like bill. When sleeping, the toucan takes great care of its bill, packing it away, and covering it carefully with the feathers of its back, and altogether presents the appearance of a large round ball of feathers. The body is about eighteen inches in length. These birds, together with the hoopoes and hornbills, have a habit of throwing their food down their throats with a peculiar jerk of the bill.

THE MACAWS.—In this family the construction of the bill is very remarkable. As the curved tip of the bill would prevent the bird from opening it wide enough to admit its food, the upper mandible is united to the skull by a kind of hinge joint, of equal



THE COCKATOOS.

strength and flexibility. When climbing among the branches of trees, or about their cages, the parrots invariably make great use of their hooked bills in assisting themselves both in ascending and descending. The crossbills have been observed to climb much in the same way.

The parrots are said to be very long-lived ; some have certainly been known to live upward of eighty years in captivity, and may be imagined to exceed that period in a wild state. The macaws are natives of South America. The blue and yellow macaw inhabits Brazil, Guiana, and Surinam, living principally on the banks of rivers.

The RINGED PAROQUET is frequently seen domesticated in this country, where its pleasing manners and gentle disposition render it a great favorite. It seems to be exceedingly fond of ripe walnuts, divided into halves ; and, while it is picking out the kernel, continually utters a short clucking sound indicative of pleasure.

It soon learns to repeat words and short sentences, and to speak with tolerable distinctness. Sometimes, when excited, it utters most ear-piercing screams, and always appears to practice any new accomplishment when it thinks that no one is within hearing. The color of the bird is green, and a rose-colored band round its neck gives it the name of the rose-ringed paroquet. The bill is red.

The COCKATOOS are remarkable for the powdery surface of their wings, and the crest on the head, which can be raised or depressed at pleasure.

The Sulphur-crested Cockatoo is an inhabitant of New Guinea. Its color is white, and the crest is of a sulphur yellow. Its white plumage glancing among the dense, dark foliage of its native forests imparts a wonderful beauty to the scene. This cockatoo is easily tamed, and is of a very affectionate disposition. When in captivity

it has been known to live to the age of 122 years. Its nest is built in hollow trees and the crevices of rocks. The eggs are white. The length of the bird is about eighteen inches.

The WOODPECKERS, whose name indicates their habits, are widely spread, being found in all quarters of the globe except Australia. They subsist on insects and grubs, which they dig out of trees, or discover under the bark. For this purpose their whole structure is admirably adapted. The bill is long, sharp, and powerful, and the formation of the feet and legs is such that the bird is able to grasp the tree firmly with the feet, while swinging with the force of his whole body against it.

Another singular point in the woodpeckers is the method by which they are enabled to thrust the tongue deep into the crevices, and bring out any insects that may happen to be there. The tongue is connected with two elastic ligaments which are inserted near the juncture of the upper mandible with the skull. From thence they sweep round the back of the head, and passing under the lower mandible, enable the tongue to be thrust out a considerable distance. The tip of the tongue is sharp, and barbed with several filaments; and more firmly to secure the prey, a kind of gummy secretion causes those insects to adhere that would be too small to be impaled.

It appears to be an erroneous opinion that these birds injure trees. Their only object in pecking away the wood and bark is to get at the insects, which they know are hidden within. Now insects seldom or never bore into healthy wood, but a decayed branch or stump is always full of them, as is well known to the entomologist; so the winged entomologist, when he perceives a decayed branch, or finds an unsound spot in the trunk, immediately sets to work industriously, and is rewarded by finding plenty of insects, which he draws out and demolishes.

Although the woodpecker does not scoop away sound trees, yet it is because they have no motive for doing so—not that the power is wanting. Wilson had an Ivory-billed Woodpecker in his possession, which pecked away lath and plaster in its efforts to escape, and utterly ruined a mahogany table to which it was fastened.

The Green Woodpecker is by far the most common in this country, and may be often seen in woods, tapping the trees with wonderful rapidity, the blows following each other something like the sound of a watchman's rattle. It generally runs up the tree in a spiral direction, occasionally striking off large pieces of dry bark. When it descends, it still keeps its head uppermost.

I have more than once seen the green woodpecker busily employed among the trees, but I have never seen it on the ground, and but once on the smaller branches of the trees.

The WRYNECK is common in the southern counties of England, but is scarcely ever seen in the north and west. It principally feeds on ants, which it picks up with great rapidity by means of its long tongue, covered with a glutinous secretion like that of the woodpecker. The rapidity with which the ants are taken is so great, that "an ant's egg, which is of a light color, and more conspicuous than the tongue, has somewhat the appearance of moving to the mouth by attraction, as a needle does to the magnet."

The term wryneck is given it from its habit of rapidly twisting its head and neck, and hissing like a serpent, if disturbed upon its eggs. The young also hiss if they are molested. Its eggs are laid on the bare wood in the holes of trees. Like most eggs that are laid in holes, they are of a pure white. The length of the bird is seven inches.

The CUCKOO, spring's harbinger, has, in all ages, obtained for itself a name at once pleasing and disreputable; pleasing, because its well-known notes are a sign that the cold winter is gone; and

disreputable, because it usurps the nests of other birds, of which the hedge-sparrow is the usual victim.

In its nest the cuckoo deposits one of its own eggs, which are remarkably small in proportion to the size of the bird. The unsuspecting hedge-sparrow hatches the intruder together with her own young. The cuckoo rapidly increases in size, and monopolizes no small portion of the entire nest, besides taking the lion's share of the provisions. The mother, however, never seems to perceive the difference, but feeds and tends the interloper with quite as much care as her own young. The young cuckoo ejects the former and rightful occupants of the nest, by managing to get the egg or young bird upon its back, clambering up to the edge of the nest, and then throwing it over by a sharp jerk.

At some times of the year, cuckoos are comparatively tame. I have repeatedly decoyed them by imitating their cry, until they came near enough for me to see the movement of the beak. The cuckoo feeds principally on the hairy caterpillars, especially those of the tiger moth, the hairs of which form a kind of lining to its stomach. These hairs are placed so regularly, that it was imagined for some time that they were a growth from the stomach itself. To settle the point, the microscope was brought to bear on the subject; and by its aid the hairs were found to be exclusively those of the caterpillar. The cuckoo will also feed on other insects, as is proved by Gilbert White, who saw several cuckoos engaged in feeding by a large pond. They were chiefly employed in catching the dragon-flies, some of which they took while resting on the water-plants, and others they caught on the wing. The length of the bird is about fourteen inches.

THE DOVE.—This family is supposed to be more widely distributed than any other. The ringdove is the largest of our native pigeons. A black ringlet round the neck, edged with white, gives

it the name of ringdove. It is very common in America ; and its nests are usually found to consist of a few sticks, thrown loosely together on a spray of fir or holly. The structure of this platform, for nest it can hardly be called, is so loose, that the white eggs can generally be seen from below through the interstices of the nest.

The following group comprises the most conspicuous varieties of the Domestic Pigeon. All these birds except the Carrier, the Pouter, and Tumbler, are very similar in their habits, and need no description. The tumbler is a small pigeon, and derives its name from its singular habit of falling backward when on the wing. Pigeon fanciers assert that a flight of twelve tumblers may be covered with a handkerchief. The pouter is a large pigeon. It stands particularly erect, and seems exceedingly vain of the swollen crop which gives it the name of pouter. The bird is enabled to inflate its crop with air, until the head is almost hidden behind it. This inflation sometimes causes the bird to lose its balance, and fall down chimneys, on which it is fond of standing.

The carrier pigeon is the bird that was so largely employed to take messages, before the invention of the electric telegraph rendered even the speed of the wind too slow for the present day. The most valuable carriers were trained to carry to and from their residence. A letter was written on a small piece of paper, and fastened under the wings of the pigeon, or to its feet. The feet were then bathed in vinegar to keep them cool, lest the bird should stop on the way to bathe. When the pigeon was set free, it rose high in the air, made one or two circular flights, and then darted off like an arrow in the proper direction. One of these birds has been known to fly nearly one hundred and fifty miles in one hour.

THE PEACOCK.—This magnificent bird is not a native of this country, but has been domesticated in America for many years.

Some suppose that it was brought from India by Alexander, and by him introduced into Europe.

The gorgeous plumes that adorn the peacock do not compose the tail, as many suppose, but are only the tail coverts. The tail feathers themselves are short and rigid and serve to keep the train spread, as may be seen when the bird walks about in all the majesty of his expanded plumage. Although pea-fowl seek their food on the ground, they invariably roost on some elevated situation, such as a high branch, or the roof of a barn or haystack. When the bird is perched on the roof, its train lies along the thatch, and is quite invisible in the dark.

In the times of chivalry, a roasted peacock, still clothed in its plumage, and with its train displayed, formed one of the chief ornaments of the regal board. The nest of this bird is made of sticks and leaves rudely thrown together, and contains from twelve to fifteen eggs. The young do not attain their full plumage until the third year, and only the males possess the vivid tints and lengthened train, the female being a comparatively ordinary bird.

A white variety of the peacock is not uncommon. In this case, the eyes of the train feathers are slightly marked with a neutral tint. The voice of the peacock is as unpleasant and unmusical as its external appearance is attractive.

The COMMON PHEASANT was originally brought from Georgia, but has completely naturalized itself in other countries. It is a hardy bird, and bears the cold months very well. Although it can be tamed, and will come to be fed with the poultry, yet an innate timidity prevents it from being thoroughly domesticated. Young pheasants that have been hatched under a hen, scamper off in terror if an unexpected intruder makes his appearance among them, although the remainder of the poultry remain perfectly unconcerned. This bird loves to perch at night on trees, especially on the spreading branches of the larch.

A white variety of the pheasant sometimes occurs, but seems never to be propagated. The nest of the bird is made on the ground, and contains from ten to eighteen eggs of a uniform dun color.

The DOMESTIC FOWLS are too well known to need much de-



THE PHEASANT.

scription. There are many varieties, the most conspicuous of which are the Cochin-China, Crested, and Bantam. The Game Fowl was formerly in great request for the cruel sport of cock-fighting. The Java Fowl, of which the enormous Cochin-China bird is a variety, is supposed to be the origin of the Barn-door fowl. The cock has

been long celebrated for his warlike propensities, and his habit of greeting the approach of morn by his "shrill clarion."

The bantam is a very little bird indeed, but exceedingly courageous, and does not hesitate to attack a turkey or such large bird with most amusing pompousness of manner. Some bantams have their legs thickly feathered down to the very toes. The hackles, or long neck feathers of this and the preceding bird, are much used by anglers for making artificial flies.

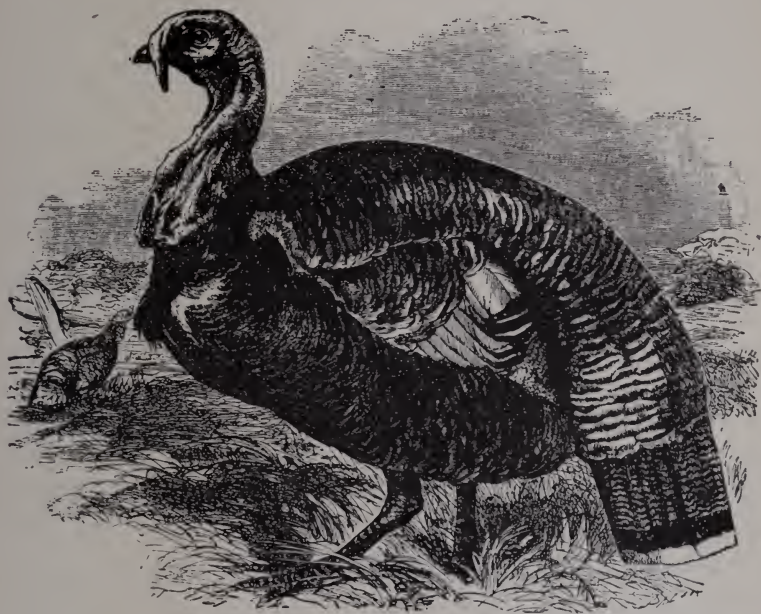
The celebrated Jungle Fowl of India belongs to this race, and is by many supposed to be the origin of our domestic game fowl. The Chinese, who are greatly addicted to the sport of cock-fighting, prefer this bird for their cruel amusement. The Dorking Fowl is a large and delicate species. The chief peculiarity in this bird is the double hind toe, so that it has five toes instead of four.

The TURKEY is an inhabitant of America, and appears to have been imported into Europe about the year 1600. Its habits in a state of domestication need no description, but when wild in its native woods are rather interesting. It is partly migratory in its habits, moving from the parts about Ohio, Kentucky, and Indiana, toward the Ohio and Mississippi. The march is usually performed on foot in large flocks, the birds seldom using their wings except when attacked, or in order to cross a river.

The powerful birds can easily cross a river of a mile in length, but the weaker frequently fall into the water, and then paddle to shore with some rapidity. This migration is performed about the end of October.

Among the birds rightly called GROUSE are the Pheasant-tailed Grouse or Cock of the Plains, the Pinnated Grouse, commonly called the prairie hen or chicken, and the Ruffled Grouse, called partridge in New England, and pheasant in the Middle States. The cock of the plains is found only in the far West; it is the largest of the American grouse, being often as large as a turkey.

The QUAIL (Bob White so called) is a common little bird, visiting America in the summer. Countless flocks of them are spread over the Southern and Middle States, and many are taken and sent to the New York markets.



THE TURKEY.

Temminck states that in their flight to Southern Europe hundreds of thousands arrive in Naples and Provence, and are so fatigued that for several days they suffer themselves to be taken by hand. The instinct to fly by night is implanted in them for the purpose of avoiding the birds of prey that would attack them by

day. The female lays from seven to twelve eggs in a rude nest on the ground. The length of the bird is seven inches; the second primary feather is the longest.

THE PTARMIGAN.—The legs and feet of the ptarmigan are thickly covered with hair-like feathers, reaching as far as the claws. Their plumage bears a singular analogy to the fur of the ermine and some other quadrupeds, as it changes in winter from a rich tortoise-shell color to a pure white. The common ptarmigan inhabits the northern parts of Europe and America, and is also found in the north of Scotland, principally among the mountains. The color of the bird is so similar to that of the mossy and lichen-covered rocks among which it dwells, that a whole covey easily eludes an unpracticed eye.

Enormous numbers of ptarmigans are annually imported from the north of Europe, especially from Norway and Sweden, to the London market. One poulterer has purchased fifteen thousand of these birds; and twenty-four thousand have been exported in one ship from one place. Like that of the grouse, the ptarmigan's nest is a loosely-constructed heap of twigs and grass, and contains from ten to fourteen eggs, of a reddish white spotted with brown.

The MOUND-MAKING MEGAPODE inhabits the dense thickets bordering on the sea-shore, and is never found far inland. Like the brush turkey, it deposits many eggs in one mound, but instead of placing them at intervals in the mound, the bird makes deep holes, from five to six feet, at the bottom of which the eggs are deposited.

The natives obtain the eggs by scratching up the earth with their fingers, until they have traced the hole to the bottom; a very laborious task, as the holes seldom run straight, and often turn off at right angles to avoid a stone or root. The mounds are enormously large. Mr. Gilbert was told by the residents that they

were the tombs of the aborigines, nor was it until after some time that their real nature was made known. The height of one mound was fifteen feet, and its circumference at the base sixty feet.

The OSTRICH is the largest bird as yet known to exist, its height being from six to eight feet. It is an inhabitant of Africa, and from thence the elegant plumes are brought. These plumes are mostly obtained from the wings of the bird, and not from the tail, as is generally imagined.

An immense number of eggs are laid by the ostriches in one spot, several birds belonging to each nest. The eggs are very large and strong, and are in general use by the Bosjesmans for holding water. By means of these eggs, which they bury at intervals in the sand, after filling them with water, they are enabled to make inroads across the desert and retreat with security, as none can follow them for want of water. Each egg holds rather more than five pints. An excellent omelet is made by the natives, by burying the fresh egg in hot ashes, and stirring round the contents with a stick through a hole in the upper end, until thoroughly cooked.

The principal strength of the ostrich lies in the legs. These limbs are so powerful that a swift horse has great difficulty in overtaking the bird. As the ostrich mostly runs in large curves, the hunters cut across and intercept the bird, which would in all probability escape if followed in its exact course. The ostrich is easily tamed, as those who have been pursued by the magnificent birds in the Zoological Gardens can testify. These frequently astonish the visitors by suddenly snatching out of his hand a bun or cake which he had intended for his own especial benefit, their long necks enabling them to reach to a surprising distance. Many of my readers have doubtless seen the tame ostriches at the Hippodrome, who ran races bearing riders on their backs, and really

seemed to enjoy the sport as much as any of the spectators.

The food of the ostrich is vegetable, and it swallows many stones, etc., to assist it in grinding its food. When in confinement it picks up anything, glass, nails, etc., from the effects of which it sometimes dies. I have assisted at the dissection of an ostrich, and have seen an astonishing amount of pebbles and other hard materials taken from its stomach, among which were a tolerably large piece of deal and a considerable portion of a brickbat.

The Rhea, or American Ostrich, is abundant on the banks of the La Plata, and is chased by the Gauchos, who pursue it on horseback, and kill it by throwing the celebrated "bolas." These curious weapons are made of a long leathern thong, having a heavy stone or leaden ball attached to each end. The Gaucho can throw it so as either to stun his prey with a blow from the ball, or strangle it by causing the thong to twist round its neck.

It is known that the rhea can swim well, and it has been seen to cross rivers several hundred feet in width, a power which the ostrich and the cassowary are not ascertained to possess. There are two species of this bird, one, the Darwin's Rhea, has been but lately introduced to science.

The CASSOWARY is a native of the eastern parts of Asia. Like the ostrich, it cannot fly, but runs with great swiftness, and if attacked by dogs kicks with extreme force and rapidity. The feathers of this bird are remarkable for being composed of two long, thread-like feathers, sprouting from the same root. The wing feathers are round, black, and strong, and resemble the quills of the porcupine. At the end of the last joint of the wing is a sort of claw or spur. The crest upon its head is composed of a cellular bony substance. The food of the bird consists of vegetable substances, and it will frequently swallow a tolerably large apple entire, trusting to the pebbles, etc., in its stomach to bruise it.



THE OSTRICH.

The EMU is a native of New Holland, and nearly equals the ostrich in bulk, its height being between five and six feet. Its feathers lie loosely on the body, and its wings are small and hardly to be distinguished. The skin of the emu furnishes a bright and clear oil, on which account it is eagerly sought after.

In its manners the emu bears a close resemblance to the ostrich. . . . Its food appears to be wholly vegetable, consisting chiefly of fruits, roots, and herbage, and it is consequently, notwithstanding its great strength, perfectly inoffensive. The length of its legs and the muscularity of its thighs enable it to run with great swiftness; and as it is exceedingly sly, it is not easily overtaken or brought within gunshot. Dogs will seldom attack it, both on account of some peculiar odor in its flesh which they dislike, and because the injuries inflicted upon them by striking out with its feet are frequently very severe. Its flesh has been compared to coarse beef, which it resembles both in appearance and taste. There is but little fit for culinary use upon any part of the emu except the hind quarters.

The voice of the emu is a kind of low booming sound. The eggs are six or seven in number, of a dark green color, and are much esteemed by the natives as food. When the natives take an emu, they break its wings, a curious custom of no perceptible utility.

THE APTERYX.—This extraordinary bird, whose name is derived from the apparent absence of wings, those members being merely rudimentary, inhabits the islands of New Zealand. It conceals itself among the densest fern, and when hunted by dogs, it hastens to seek a refuge among rocks and in the chambers which it excavates in the earth. In these chambers its nest is made and the eggs laid. The natives hunt it with great eagerness, as the skins are used for the dresses of chiefs, who are so tenacious of them that they can hardly be persuaded to part with a single skin.

The feathers are employed to make artificial flies. When attacked it defends itself by rapid and vigorous strokes with its powerful feet.

For many years naturalists considered the apteryx an extinct species. Latterly the question has been set at rest, not only by the researches of Gould and other naturalists, but by the arrival in this country of several skins and one living specimen, now in the Zoological Gardens. This bird has a singular habit of resting with the top of its bill placed on the ground. The nostrils of the apteryx are placed almost at the very extremity of the bill. The aborigines of New Zealand give it the name of Kiwi Kiwi. The food of the bird consists of snails, insects, and worms, which latter creatures it obtains by striking the ground with its feet, and seizing them on their appearance at the surface.

THE DODO.—This singular bird, which is supposed to be extinct, was discovered in the Mauritius by the earlier voyagers. For many years their accounts of the Dodars were supposed to be mere flights of fancy. Lately, however, the discovery of several relics of this bird in various countries has set the question of its existence at rest, but not the question of the proper position of the bird. Some think it belongs to the pigeons, and some to the ostriches.

It is still within the range of possibility that the bird may again be discovered, as at present but little of Madagascar has been searched, and in that island, if anywhere, it will be found.

The PLOVERS are known by their long legs, short toes, and long, powerful wings. Many are inhabitants of America, of which the Upland or Field and Golden Plover are the most common.

The Golden Plover is very common in most parts of the United States, and is well known from its plaintive cry, and the stratagems it employs to decoy intruders away from its nest, or

rather eggs, for nest it has none. Frequently, however, the attempts of the bird only draw the attention of the passer-by to the evident vicinity of the eggs. These eggs are dark brown, blotched with black, and are hardly to be distinguished from the soil where they are laid. If an intruder approach them, the bird glides before him, and flutters along, drooping her wings, as if wounded, invariably endeavoring to lead him away from her nest. When it has succeeded in decoying away the intruder, it suddenly mounts in the air, uttering its cry of pee-weet, leaving the pursuer to gaze with astonishment at the escaping bird.

The eggs are considered great delicacies. When flying, the black and white colors of its plumage make it very conspicuous. On the head of the bird is a kind of crest.

The COMMON CRANE is now but rarely seen on our shores, although formerly it was very common. It flies at so great a height that, although its hoarse cry is audible, the bird itself is far out of the reach of sight. It generally feeds on snails, frogs, and worms, but is not by any means averse to newly-sown grain. The nest is made among reeds and rushes, and contains two bluish-green eggs, marked with brown. The length of the bird is nearly four feet.

The HERON, or HERNE, is a bird renowned in the noble science of falconry. The common heron generally breeds in company, like the rooks; indeed, these two birds frequently inhabit contiguous trees, but never interfere with each other.

In the dawn of the early morning, or while the moon casts an uncertain light, the heron may be seen standing in shallow water, stiff and motionless, and by the faint light may be mistaken for a stump of a tree. But his eye is keenly directed on the water, and no sooner does a fish approach, than a dart of his unerring bill secures it, and the heron soars exultingly to his nest, bearing his prey with him. The fixed patience that the heron displays has

caused it to be chosen as the emblem of solitude. Its plumes were formerly considered as ornaments only to be worn by the noble.

The heron sometimes killed the falcon in its stoop by throwing its head back, whether purposely or not is not known, and receiving its enemy on the point of its sharp beak, by which the falcon was transfixed as if on a bayonet. It has been lately ascertained that the heron can swim in deep water, and does so when it sees any prey that cannot be reached by wading, such as a nice nestful of young moor-hens, or a water-rat engaged at his dinner. The nest of the heron is a flat mass of sticks, laid on the highest branches of a tree, and contains five bluish-green eggs.

THE BITTERN.—The beautiful bittern has been almost banished from this country, although it was formerly a common bird. It frequents morasses and dense beds of reeds, where it lies concealed until the evening, when it leaves its rushy bed and soars to a vast height, continually uttering its sepulchral booming cry. This singular sound is not unlike the bellowing of a bull, and is most startling in its effects.

In olden times the bittern was one of the birds chiefly sought after in falconry, as the stout defence it makes against its enemies, by darting its sharp powerful beak at them, and beating violently with its feet, renders it by no means an easy prey. The plumage of this beautiful bird is a rich reddish-yellow ground, boldly variegated with various black marks, which are most conspicuous in the loose, long feathers that decorate its neck. In size it is a little less than the heron. It feeds principally on small reptiles, field-mice, and fish. Its nest is built on some slight elevation in a morass, and contains five bluish-green eggs.

THE WHITE SPOONBILL.—The common spoonbill is found in Europe, Asia, and Africa, and frequents Holland, together with the stork. The strange shape of the tip of its beak has gained it the

name of spoonbill. It has rarely been taken in this country. It feeds on worms, snails, and water plants, searching for the latter by agitating the water with its broad beak.

The nest of the white spoonbill is sometimes placed in trees, and sometimes amid rushes. It contains three whitish eggs, slightly spotted with red. The length of the bird is not quite three feet.

The STORK is extensively found throughout Europe, Asia, and Africa. In Holland storks are very abundant, and are encouraged by the Dutch to build in their towns. Among the ruins of Persepolis they are very common, scarcely one pillar being without a stork's nest at the summit. In Holland a kind of false chimney is built by the inhabitants for these birds to make their nests in. When the stork cannot find a building on which to make its nest, it chooses the flat, spreading branches of cedar or pine, and there collects a large mass of sticks and twigs, on which it lays from three to five whitish eggs. When disturbed, the birds make a great clattering with their bills.

The food of this bird consists of rats, mice, frogs, etc.; and it is for the benefits it confers upon man by devouring these vermin, that it is so carefully protected and encouraged, especially in the East, where the inhabitants do not trouble themselves to remove carrion or offal, but leave that office to the vultures, hyenas, and other scavengers of nature. The height of the stork is nearly four feet.

The SACRED IBIS inhabits Egypt, but does not seem to breed there. This is the bird so frequently depicted in the hieroglyphics as playing a conspicuous part in religious ceremonies. Their mummies are constantly found in the tombs, and in one of these mummies Cuvier discovered remnants of skin, and scales of snakes. It is a migratory bird, appearing simultaneously with the rise of the Nile, and departing as the inundation subsides. The sacred ibis is about the size of an ordinary fowl.



THE STORK.

The CURLEW is found in the northern part of England and Scotland, and is spread over the whole of the Old World, from South Africa to the polar regions. In winter it collects in large flocks on the muddy shores of the sea, where its long, curved bill can easily penetrate in search of food.

It is an exceedingly shy bird, and cannot easily be approached within gunshot. Its nest is composed of grass and rushes, collected under the shelter of a tuft of heath or grass, and contains four greenish-olive eggs blotched with brown. The length of the bird slightly exceeds two feet.

The AVOCET is spread throughout the warmer regions of Europe, and is also found in some parts of Africa. It is very common in Holland, and is frequently seen on the eastern coasts of England. It frequents marshes and the mouths of rivers, where it finds in the mud myriads of the small worms and insects on which it feeds, and which it obtains by scooping them up from the mud with its curiously curved bill. It is a good swimmer, but seldom has recourse to that art except when it wades unexpectedly out of its depth.

The eggs of the avocet are laid on the ground, in a depression sheltered by a tuft of herbage. Their color is a bluish green, spotted with black. The birds when disturbed at their nests feign lameness, like the lapwing, in order to draw the intruder to a distance. The length of the bird is eighteen inches.

The WOODCOCK frequents dense thickets during the day, but at night it leaves these retreats, and visits the swamps and flooded meadows, where it finds a sufficiency of worms and insects. The nest of this bird is a loose mass of grass and leaves, gathered together in some sheltered depression. The eggs are four in number, of a yellowish brown, blotched with dark brown and gray.

The SNIPE is too well known to need description. In its habits it much resembles the woodcock. Its flight is very singular, rendering it a difficult mark.

The CORNCRAKE, or LANDRAIL, is very common in England. During the early part of the summer months its harsh cry may be heard in almost every field, but the bird itself is very seldom seen, as it threads its way among the long grass with marvellous rapidity. Its cry can be so exactly imitated by drawing a quill sharply across the teeth of a comb, that the bird may be decoyed by the sound until quite close to the operator. The corncrake is so averse to rising on the wing, that a dog is frequently employed to hunt it.

The young when taken feign death with admirable accuracy, nor do they move until they imagine that the intruder is safely out of the way. The nest of the corncrake is by no means uncommon. It is formed of hay, collected and worked into some depression in the ground, and contains from eight to twelve eggs, of a grayish yellow, covered with dark brown spots. The length of the bird is about nine inches.

The WATER-HEN, or MOOR-HEN, is very common along the reedy banks of rivers and ponds. It is very widely distributed, being found in almost all parts of the Old World. It swims very gracefully, constantly nodding its head, and dives with great skill and rapidity, particularly when alarmed, in which case it generally dives under some floating herbage, and remains there with merely its beak above the water until the danger is passed. On account of this habit, it is almost useless to shoot this bird unless the sportsman is accompanied by a dog, for if it is not shot dead it instantly dives, and nothing but a dog can discover its retreat. It runs on land with considerable activity, constantly flirting up its tail, so as to show the white feathers beneath, and when alarmed, instantly makes for the water.

The nest of the water-hen is built among sedges and reeds at the water-side, and contains from five to eight or nine eggs, of a cream yellow spotted with dark brown. When the water-hen

leaves her nest, she covers the eggs with dried grass and reeds, so as completely to conceal them, apparently, lest the rats should discover them. The young when hatched look like round tufts of black down. They swim and dive well, following their parent with great address. The pike is their chief enemy, and destroys numbers by darting at them from under the cover of water-lilies or other plants.

The FLAMINGO is an inhabitant of the warmer parts of Europe, and is common in Asia and the coasts of Africa. The singularly shaped beak of this splendid bird is peculiarly adapted to its long and flexible neck. When the bird wishes to feed, it merely stoops its head to the water; the upper mandible is then lowest, and is well fitted to receive the nutritive substances which are entangled in a filter placed on the edges of the beak, much resembling the analogous apparatus of the whale.

The flamingo frequents marshes, lakes, and mouths of rivers, bidding defiance to the pestilent exhalations that drive man far from their haunts. The color of their plumage is a deep brilliant scarlet, except the quill feathers, which are black. When a number of these birds stand ranged in a line, according to their custom, they present the appearance of a small and well-drilled body of soldiers.

The nest of the flamingo is a curious conical structure of mud, with a cavity at the summit, in which are placed two or three whitish eggs. When the female bird sits on the nest, her feet rest on the ground or hang into the water. The height of the bird is between five and six feet.

Of the TAME GOOSE, *Anser ferus*, nothing need be said, except that enormous flocks are bred, containing from two to ten thousand birds each. The birds are periodically subjected to the operation of plucking out the quill feathers.



THE BERWICK'S SWAN.

THE MUTE SWAN.

THE WHISTLING SWAN.

The MUTE or TAME SWAN, a well-known ornament to our lakes and rivers, is not an inhabitant of America, but was introduced from Eastern Europe and Asia several years back. All are familiar with the graceful deportment of this bird while sailing on the surface of the water. Unfortunately its progress on land by no means corresponds with its aquatic grace, being confined to an awkward waddle.

The female swan makes its nest of a great mass of dry reeds, placed among osiers or rushes near the water, and lays six or eight large white eggs. During the incubation, and while the young are still small, the parent birds defend them with great assiduity and courage.

“Like a BLACK SWAN,” was formerly a well-known proverb, analogous to the Horse Marines of the present day; unfortunately for the proverb, a swan has been discovered in Australia, the whole of whose plumage is a jetty black, with the exception of the quill-feathers, which are white. It has been domesticated in this country, and may be seen in the Central Park, eagerly seeking after the crumbs offered by juvenile hands. It is rather smaller than the Whistling Swan.

The MALLARD, or WILD DUCK, is the origin of our domestic bird, and is widely spread over the northern parts of Europe, Asia, and America. In the winter it migrates in countless flocks to the warmer States. Incredible numbers of these birds are taken in a very ingenious trap, called a decoy. It is a perfect edifice of poles and nets, and is built in the form of a tube, very wide at the mouth, and very narrow at the extremity. The ducks are induced to enter the “pipe” by the antics of a dog, and by some hemp-seed previously strewn on the water. They are then driven onward to the smaller end, where they are caught and killed.

The COLYMBIDÆ are remarkable for their powers of diving.

The legs are placed very far behind, and the toes are so arranged as to fold up when returning from the stroke.

The foot of the GREBES is not webbed like that of most water-birds, but each toe is separated and flattened, so as to serve as a separate paddle. The grebes dive so instantaneously that it is difficult to shoot them, as they dive at the flash, and do not reappear for nearly two hundred yards, and then they merely raise their head above water for a second, and again disappear.

All the grebes feed upon fishes and the various water insects, but their stomachs are almost invariably found to contain a mass of their own feathers. This circumstance presents a singular analogy to those masses of compacted hair which are found in the stomachs of cows. In all probability the reason for their presence is the same; the feathers and hairs are accidentally conveyed to the stomach after the creature has been making its toilet.

Of the three British species of Divers, the GREAT NORTHERN DIVER is the largest. It is generally found on the shores of the Orkneys and Shetland. This bird justly deserves its name of diver, as it can pursue fish under water with the greatest ease and certainty, and can remain under water without inconvenience for a considerable time. The nest of this bird is a very large flattened mass of dead herbage, and is placed near the water's edge, in some place where the bird imagines that the reeds and flags, among which it is laid, will guard it from discovery. But, unfortunately, the bird dislikes flying, and prefers to walk to and from its nest, thereby leaving a very evident track, by which it is often discovered. The eggs are usually two in number, although three have been found in one nest. Their color is dark olive brown, sparingly marked with dark spots.

The PUFFIN is common at the Needles and the western islands of England. It forms deep burrows in the soil, in which one egg

is deposited, or usurps the burrow of a rabbit. The hole is generally from three to four feet in depth, when the puffin is forced to labor for itself; it usually takes a winding course; and the inhabitant is secured from surprise by forming two entrances, in order that if one entrance is attacked, it may escape by the other.

The egg is always deposited at the furthest extremity of the hole, and is not easy to be obtained, on account of the vigorous resistance made by the parent bird. It is an excellent diver, plunging fearlessly from a lofty cliff into the sea, and speedily returning with its beak full of fish, usually sprats, which are secured by their heads, and lie in a row along the bill of the puffin, forming a kind of piscatorial fringe. Its enormous and sharp-edged bill renders it a formidable antagonist to intruders. The length of the bird is thirteen inches.

It is said that the raven and the puffin have occasional conflicts, the object of dispute being generally the egg or young of the auk, for which the raven has a great predilection. The issue of the combat depends principally on its position, each bird trying to keep to its own peculiar element. If the puffin can drag the raven over the rocks into the sea, it is speedily victorious, as it drowns its adversary without much trouble, but if, on the contrary, the raven can keep to shore, its superior size and strength gain the dominion.

The CAPE PENGUIN is very common at the cape of Good Hope and the Falkland Islands. From the extraordinary sound it produces while on shore, it is called the Jackass Penguin. Darwin gives the following interesting account of this bird: "In diving its little plumeless wings are used as fins, but on the land *as front legs*. When crawling (it may be said on four legs) through the tussocks, or on the side of a grassy cliff, it moved so very quickly that it might readily have been mistaken for a quadruped. When at sea and fishing, it comes to the surface, for the purpose of

breathing, with such a spring, and dives again so instantaneously, that I defy any one at first sight to be sure that it is not a fish leaping for sport."

These birds feed their young in a very singular manner. The parent bird gets on a hillock, and apparently delivers a very impassioned speech for a few minutes, at the end of which it lowers its head and opens its beak. The young one, who has been a patient auditor, thrusts its head into the open beak of the mother, and seems to suck its subsistence from the throat of the parent bird. Another speech is immediately made, and the same process repeated until the young is satisfied. This penguin is very courageous, but utterly destitute of the better part of courage—discretion; for it will boldly charge at a man.

The *STORMY PETREL* is, under the name of Mother Carey's chicken, the terror of the sailor, who always considers the bird as the precursor of a storm. It is the smallest of the web-footed birds. Few storms are violent enough to keep this curious little bird from wandering over the waves in search of food that the disturbed water casts to the surface. Like the fulmar, the stormy petrel is so exceedingly oily in texture that the inhabitants of the Faroe Islands draw a wick through its body and use it as a lamp.

The *WANDERING ALBATROSS*, the largest of the genus, is a well-known bird in the southern seas, following ships for many miles in hopes of obtaining the refuse thrown overboard. So voracious is the albatross that it will swallow entire a fish of four or five pounds' weight. The flight of this bird is peculiarly majestic. Its extreme length of wing prevents it from rising at once from the ground, but when once launched into the air it seems to float and direct its course without effort.

The voracity of the albatross renders it an easy prey. A hook is baited with a piece of blubber, fastened firmly to a string,

and suffered to tow astern. The bird immediately sweeps down to seize its prey, and is arrested by the hook, by means of which it is drawn into the ship. It seems rather remarkable that a bird that lives in or over the sea during its whole life should prove a landsman when taken on board. Yet, when the albatross is caught and placed on deck, it begins to stagger about, and soon becomes as thoroughly seasick as the most inexperienced passenger. The expanse of the wing in the wandering albatross is from eleven to fourteen feet.

The *SILVERY GULL* is seen all along the Atlantic coast. During the winter it seeks the warmer coasts of the southern States. Its nest is composed of grass, rushes, and other materials, and contains three or four eggs, of an olive green marked with very dark brown. Neither the gulls nor the terns dive, but snatch up their prey when at or near the surface.

The *TERNS* or *SEA-SWALLOWS* are possessed of great power and endurance of flight, their long forked tails and pointed wings indicating strength and swiftness. The common tern is found in plenty along the southern shores of Europe, and in many parts of Asia and Africa. It is frequently seen on the southern shores of England, and has been found in North America.

It preys on fish, which it snatches from the surface with unerring aim, as it skims over the waves with astonishing velocity. The nest of this bird is made on the sand above high-water mark, and contains two or three eggs, on which the female usually sits by night. The length of the common tern is about fourteen inches. The Noddy, so frequently celebrated by travellers who have passed the equator, is a species of tern.

The *CORMORANT* is found in abundance on the American coast and is widely spread over many parts of the world. It is exceedingly voracious, and devours an almost incredible amount of fish.



THE PELICAN.

It is an excellent diver, and chases the fish actually under the water, seldom if ever returning without having secured its prey. Like the otter when engaged in chase, it occasionally rises to take breath, and then resumes the pursuit with renewed vigor.

The cormorant has the power of perching on trees, an accomplishment which we would hardly suspect a web-footed bird of possessing.

The cormorant is easily tamed, and its fishing propensities can be turned to good account. The Chinese, at the present day, employ a kind of cormorant for that purpose, having previously placed a ring round the bird's neck, to prevent it from swallowing the fish. The eggs of this bird are usually laid on a rock, but sometimes in the branches of trees. A thick coat of chalk envelops the eggs, and can be easily scraped off with a knife. The length of the bird is about three feet.

The WHITE PELICAN inhabits Africa, India, a great part of the south eastern portions of Europe and the United States. It is a very conspicuous bird, its singular membranous pouch offering a distinction perfectly unmistakable. The pouch, when distended, holds two gallons of water, but the bird has the power of contracting it so that it is scarcely to be discerned. The pouch also serves as a net in which to scoop up the fish on which the pelican feeds. Another most important use of the pouch is to convey the food to the young. The parent pelican presses the pouch against its breast, in order to enable the young to obtain the fish; which action, in all probability, gave rise to the fable of the pelican feeding its young with its own blood. The red tips of the bill probably aided the deception.

Although a web-footed bird, the pelican, like the cormorant, can perch on trees, although it prefers sitting on rocks. The color

of this bird is a pure white, with a very slight tinge of rose-color, and the pouch is yellow. The length of the bird is nearly six feet.

### REPTILES.

We now arrive at the singular class of REPTILES. The animals of this class vary exceedingly in their forms, sizes, and habits, but the peculiar formation of the circulatory system, together with many other anatomical distinctions, plainly mark them out as a distinct class.



THE GREEN LIZARD.

The LIZARDS are usually active, bright-eyed little creatures, delighting to bask in the sun, near some safe retreat, to which they dart with astonishing celerity upon the slightest alarm. Two species of lizards inhabit this country, the common lizard and the sand lizard. The latter animal is considerably larger than the common lizard, as it sometimes measures a foot in length. It frequents sandy heaths, and in the sand its eggs are deposited, fourteen or fifteen in number. The eggs are hatched by the heat of the sun,

and the young immediately lead an independent life. During the winter this as well as the common lizard hibernates in a burrow usually made under the roots of a tree, nor does it again make its appearance until the spring.

The common lizard is only six inches in length. It is more active than the sand lizard, disappearing like magic on being alarmed. When seized, its tail frequently snaps off like glass. Both lizards feed on insects.

The BLIND-WORM is not a snake, as generally supposed, but a legless lizard of the Skink family. It is perfectly harmless; its small mouth and very minute teeth precluding all attempts to injure, even if it had the will. When alarmed, it snaps asunder at the slightest blow, like the tail of the common lizard, and from that peculiarity has derived its name of "fragilis." It feeds almost entirely on small slugs, its jaws not being capable of admitting any larger prey. It is very common in most parts of America, and may be seen basking in the sun in hedge-rows or under old walls. Its eyes are very small, but brilliant.

The IGUANA family is a very large one, containing 150 species. The common iguana is a native of Brazil, Cayenne, Jamaica, etc. In spite of its repulsive appearance, it is with many people a favorite article of food, and is said somewhat to resemble chicken. It is very fierce when attacked, and snaps at its enemies in a most determined manner, often scaring away an intruder by the ferocity of its aspect.

It is generally taken by throwing a noose over its head, and dragging it from the branches by main force. It is then immediately killed, as its sharp notched teeth can inflict a very disagreeable wound. Sometimes it is hunted with dogs trained to the sport. It attains a considerable size, frequently reaching the length of six feet. It feeds usually on vegetable substances, such as leaves, fruit,

and fungi ; but iguanas have been seen in the Island of Isabella that feed on eggs, insects, and even the intestines of fowls.

The terrible name of a FLYING DRAGON belongs to a harmless little lizard that lives on trees and feeds on insects. The peculiar structure of its body bears a singular resemblance to that of the flying squirrel. The first six false ribs are greatly elongated, and support a wing-like expansion of skin, which when stretched serves to bear them up as they skim through the air from one tree to another. While running about on the branches, the so-called wings are folded to the side, but when it wishes to throw itself from the tree, the ribs are raised, and the wings expanded. It is common in Java, India, and Borneo.

The COMMON CHAMELEON is plentifully found in northern Africa, the south of Spain, and Sicily. It lives on trees, but exhibits none of the activity usually found in aboreal reptiles. On the contrary, its movements are absurdly grave and solemn. The whole activity of the animal seems to be centred in its tongue, by means of which organ it secures flies and other insects with such marvellous rapidity that the ancients may well be pardoned for their assertion that the air formed the only food of the chameleon.

Highly exaggerated descriptions have been given of the changes of color in the animal. The changes are by no means so complete, nor are the colors so bright, as generally supposed.

The power of the chameleon to move its eyes in different directions at the same time gives it a most singular aspect. Its enormously long tongue can be withdrawn into the mouth when not in use ; but when the creature sees a fly within reach, the tongue is instantly darted forth, and by means of a gummy secretion at the tip secures the fly. The whole movement is so quick as almost to elude the eye.

The peculiar gliding movements of the SNAKES render them

excellent types of the reptiles ; a word derived from the Latin *repto*, I creep. The extraordinary flexibility of their bodies is caused by the structure of their vertebræ, each one of which fits into the one behind it by a ball-and-socket joint, thus allowing freedom of motion in every direction.

The RATTLESNAKE is a native of America. Its name is derived from the loose bony structure at the extremity of its tail, called the rattle, and which by the sound of its movements gives timely intimation of the vicinity of this terrible reptile. Fortunately, its disposition is exceedingly sluggish, and it invariably sounds its rattle when irritated or disturbed. Its bite is inevitably mortal, and death always ensues within a few hours after the wound has been inflicted.

The deadly weapons with which the venomous serpents are armed are two long curved fangs belonging to the upper jaw, and moving on a hinge, by which they lie flat in the mouth when not wanted. An aperture exists in the point of the fang, by which a poisonous fluid, secreted in a gland at the base of the tooth, is poured into the wound, and, mixing with the blood, rapidly carries its deadly influence throughout the entire system. A short time since an American physician was exhibiting a caged rattlesnake to his friends ; he approached his hand too near the irritated reptile, who instantaneously inflicted a wound ; and, although every precaution was taken, the bite proved fatal in a few hours.

An American traveller told me that, even when these snakes are ready for a spring, they can be avoided by smartly clapping the hands together, or striking the ground with a stick. The snake has the whole powers of its mind bent upon its fatal stroke, and, on hearing such an unexpected sound, it is startled, like a man suddenly waked from sleep, and falls down in its coil again, giving time for its intended victim to escape before it has made up its

mind to another assault. The length of this snake has seldom been known to exceed seven feet.

The PUFF ADDER is an inhabitant of Southern Africa. It is a short, thick, somewhat flat snake, of a most sinister and malignant aspect. The following alarming adventure occurred to Mr. Cole,



THE RATTLESNAKE.

a resident in the Cape: "I was going quietly to bed one evening, wearied by a long day's hunting, when, close to my feet and by my bedside, some glittering substance caught my eye. I stooped to pick it up; but, ere my hand had quite reached it, the truth flashed across me—it was a snake! Had I followed my first

natural impulse, I should have sprung away, but not being able clearly to see in what position the reptile was lying, or which way his head was pointed, I controlled myself, and remained rooted breathless to the spot. Straining my eyes, but moving not an inch, I at length clearly distinguished a huge puff adder, the most deadly snake in the colony, whose bite would have sent me to the other world in an hour or two. I watched him in silent horror; his head was from me; so much the worse—for this snake, unlike any other, always rises and strikes back. He did not move; he was asleep. Not daring to shuffle my feet, lest he should awake and spring upon me, I took a jump backward, that would have done honor to a gymnastic master, and thus darted outside the door of the room; with a thick stick I then returned and settled his worship."

It is more dangerous, because it has a way of flattening itself upon the ground; so that, when it is lying thus concealed upon the sand, an incautious pedestrian is very likely to tread upon it.

THE COMMON VIPER, or ADDER, is the only venomous reptile inhabiting England, nor is its bite nearly so dangerous in its consequences as has been reported. Seldom has the bite of the viper proved mortal; and in all probability, had proper precautions been taken, no case would have been fatal. Viper-catchers employ olive oil as a remedy against the bite, and, from all accounts, it appears to be a certain preservative against all evil effects. The oil should be heated to produce its full efficacy.

It is asserted that, when danger threatens, the female viper opens her mouth and permits her brood to hide themselves, but it is by no means an ascertained fact. Frogs, lizards, mice, and other small animals, form the food of this reptile, but sometimes it falls a victim to its own voracity.

THE BOA-CONSTRICTOR.—The enormous boa-constrictor in-

habits tropical America. It is not venomous, but it is not the less dangerous, as the tremendous power of its muscles enables it to crush its prey in the coils of its huge body.

In order to procure its food, the boa-constrictor lies in wait by the side of some river or pool, where animals of all kinds are likely to come and quench their thirst. It patiently waits until some animal draws within reach, when, with one spring, the boa fixes its teeth in the creature's head, coils its body round its victim, and crushes it to death. After the unfortunate animal has been reduced almost to a shapeless mass by the pressure of the snake, its destroyer makes preparations for swallowing it entire, a task which it accomplishes, although the slaughtered animal is usually very much larger than the dimensions of the serpent. At last the snake succeeds in swallowing its prey, and then lies torpid for nearly a month, until its enormous meal is digested, when it again sallies forth in search of another. Even the buffalo has been known to fall a victim to this fearful serpent, whose length frequently exceeds twenty-five feet.

The COBRA DE CAPELLO is a native of India. The serpent-charmers invariably use this formidable reptile for their performances. The exhibitors possess several cobras shut up in baskets, and when commencing their performances, the lid of the basket is opened, and the snake creeps out. Its course is arrested by the sound of the rude fife that the charmer always carries, and it immediately expands its beautiful though threatening hood, erects its neck, and commences a series of undulating movements, which are continued until the sound of the fife ceases, when the snake instantly drops, and is replaced in its basket by its master.

The charmers appear to be able to discover snakes, and to induce them to leave their retreat. Indeed it is rather a singular fact that those travellers who most strongly insist that the snakes

thus caught are tame and divested of their fangs, appear to forget that even in that case the creatures must have been previously caught in order to deprive them of their weapons. The length of this snake is about five or six feet.

THE COMMON RINGED OR GRASS SNAKE is a harmless inhabitant of this country, and may frequently be seen or heard gliding along the hedge-banks in search of food. It is easily tamed, and soon learns to know its master. It lives principally on frogs, mice, young birds, newts, etc. It is an excellent swimmer, and from the peculiar construction of its lungs, can remain under water for some time.

Like all other serpents, the ringed snake sheds its skin several times during the year. The entire skin comes off, even the covering of the eyes. A rent opens in the neck, and the snake, entangling itself in the thick grass or bushes, actually creeps out of its skin, turning it inside out in the effort.

THE TORTOISE.—The whole of this order is characterized by the complete suit of bony armor with which the animals are protected. The so-called "shell" is in fact a development of various bones, and not a mere horny appendage, like the coverings of the armadillo and manis.

The upper shield is called the "carapace," and is united to the under shield or "plastron" by certain bones, leaving orifices for the protrusion of the head and limbs. Most species are able to withdraw their head and limbs completely within the shell, and in some few the orifices are closed by a kind of hinge joint. The tortoise-shell of commerce is a series of horny plates that cover the exterior of the shield, and is in great request, on account of the beautiful wavy markings that are so familiar to our eyes.

The tortoises and turtles possess no teeth, but the sides of their jaws are very hard and sharp, enabling them to crop vegetable

substances, or to inflict a severe bite. The family is divided into Land Tortoises, Marsh Tortoises, River Tortoises, and Marine Tortoises, or Turtles.

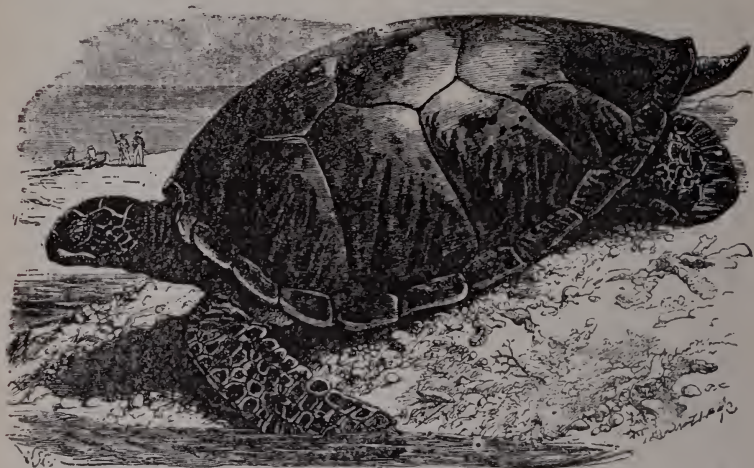
The COMMON LAND TORTOISE is found in abundance in the south of Europe. It is often kept in captivity in this country, and is very long-lived, individuals being known to have exceeded two hundred years. Its movements are very slow, but it can excavate a burrow with unexpected rapidity. Secure in an impenetrable covering it bids defiance to any ordinary enemy, except man and the boa-constrictor. Man, however, takes him home and roasts him, and the boa-constrictor swallows him whole, shell and all, and consumes him slowly in the interior.

I had a common land tortoise for a few months, part of whose life is described in the following passage: Some time since, a man arrived in town, bringing with him tortoises for sale. They passed their existence in a basket, where they were packed close, like so many bricks, standing on their tails, and their heads looking out of the basket. When I purchased one of them, the man emptied out his whole basketful upon the table, and then turned out the contents of four large pockets, until a large table was entirely covered with them.

The tortoise which I purchased was a very small one, and was tolerably lively, walking about the room, and always settling on the hearth-rug. It had a great genius for climbing, and would sometimes spend nearly an hour in endeavoring to scale the fender, probably attracted by the heat. Unfit as the form of the creature may seem for such a purpose, it did contrive to scramble upon a footstool which was placed by the fender.

Its method of attaining this elevation was as follows: First it reared up against the footstool in the angle formed by it and the fender, and after several ineffectual attempts, succeeded in hitching

the claws of one of its hind feet into the open work of the fender. On this it raised itself, and held on to the top of the stool by its fore feet, while it gained another step on the fender, and so managed to raise itself to such a height, that it only had to fall flat on the top of the footstool. When once there, it could hardly be induced to leave the elevation which it had gained with such difficulty.



THE GREEN TURTLE.

Its food consisted of bread and milk, which it ate several times a day, drinking the milk by scooping up some of it in its lower jaw, and then, by throwing its head back, the milk ran down its throat. Tortoises are generally long-lived, but this animal died within a few months after it came into my possession, in all probability because, for some days, its food was placed in a brass vessel. Several days before its death it was very restless, and went about

the room mewling like a young kitten, and made such a noise that it had to be ejected during working hours. I could not for some time believe that the mewling could proceed from the tortoise, as the resemblance to that of a kitten was most exact.

THE COMMON GREEN TURTLE.—The feet of the marine tortoises, or turtles, are modified into fins or flippers, just as are the feet of the seals, and consequently, although the turtles are active in the water, on land their walk is nothing but an awkward shuffle. The flippers, however, are admirable instruments for scooping out the sand, in which the eggs are laid, and afterward covered over. Nearly two hundred eggs are laid in one nest. The eggs are held in great estimation, but the albumen, or “white,” does not become hard by boiling.

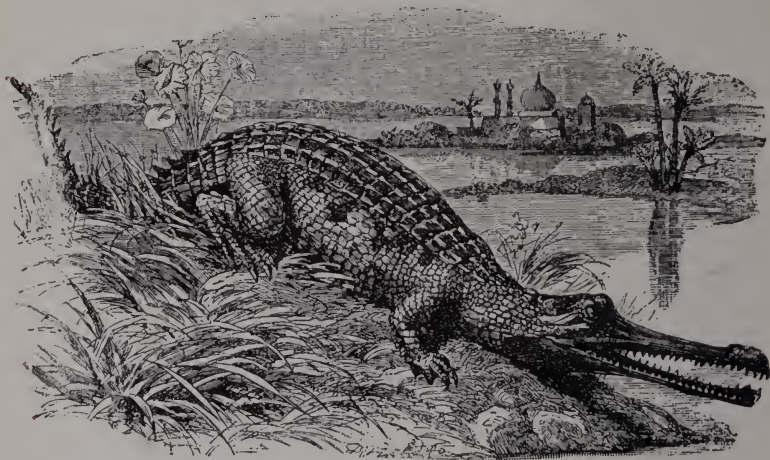
The green turtle, which is named from its green fat, from which turtle soup is made, is common in Jamaica, and most of the islands of the East and West Indies. The turtles are captured by turning them on their backs; for the carapace is so flat, and their legs are so short, that they are forced to lie helpless until their captors have leisure to drag them away. The green turtle has been known to reach the weight of five or six hundred pounds. The tortoise-shell of commerce is almost entirely obtained from the hawksbill turtle.

THE CROCODILE.—These animals are separated from the lizards on account of the peculiar horny covering with which they are protected.

The crocodile is an inhabitant of the Old World, the alligator of the New, and the two animals are best distinguished by the construction of the jaws. In the crocodiles the lower canine teeth fit into a *notch* in the edge of the upper jaw, and there is in consequence a contraction of the muzzle just behind the nostrils. The

lower canine teeth of the alligators fit into a *pit* in the edge of the upper jaw, and in consequence no contraction is needed.

At the back of the throat is a valve completely shutting out water, but leaving the passage to the nostrils free, so that the crocodile can keep his mouth open when beneath the surface, without swallowing the water, or can hold his prey to drown under the



THE GAVIAL, OR GANGETIC CROCODILE.

water, while he breathes at ease with his nostrils at the surface. There is no true tongue.

The common crocodile inhabits many African rivers, and is, probably, the reptile infesting the Ganges. The Nile, however, is the best known haunt of this terrible creature.

The crocodile feeds on fish, floating carrion, and dogs, or other animals, which it is enabled to surprise as they come to drink at the water's edge, but man frequently falls a victim to its

voracity. In revenge for this treatment, all nations persecuted with this pest have devised various methods of killing it.

The negroes of some parts of Africa are sufficiently bold and skilful to attack the crocodile in his own element. They fearlessly plunge into the water, and diving beneath the crocodile, plunge the dagger with which they are armed into the creature's belly, which is not protected by the coat of mail that guards the other parts of its body.

The usual plan is to lie in wait near the spot where the crocodile is accustomed to repose. This is usually a sandy bank, and the hunter digs a hole in the sand, and armed with a sharp harpoon, patiently awaits the coming of his expected prey. The crocodile comes to its accustomed spot, and is soon asleep, when it is suddenly roused by the harpoon, which penetrates completely through its scaly covering. The hunter immediately retreats to a canoe, and hauls at the line attached to the harpoon until he drags the crocodile to the surface, when he darts a second harpoon. The struggling animal is soon wearied out, dragged to shore, and dispatched by dividing the spinal cord. In order to prevent the infuriated reptile from biting the cord asunder, it is composed of about thirty small lines, not twisted, but only bound together at intervals of two feet.

When on land it is not difficult to escape the crocodile, as certain projections on the vertebræ of the neck prevent it from turning its head to any great extent. The eggs of this creature are very small, hardly exceeding those of a goose; numbers are annually destroyed by birds of prey and quadrupeds, especially the ichneumon.

The ALLIGATOR or CAYMAN, is an inhabitant of America, and is unpleasantly common in the rivers of our Southern States. It pursues fish with exceeding dexterity, by driving a shoal of them into a creek, and then plunging amid the terrified mass, and de-

vouring its victims at its pleasure. It also catches pigs, dogs, and other animals that venture too close to the river. In that case, as the animal is too large to be swallowed entire, the alligator conceals it in some hole in the bank until it begins to putrefy, when it is dragged out, and devoured under the concealment of the rank herbage fringing the river.

The usual method of taking this creature is by baiting a most formidable four-pointed hook, composed of wooden spikes, artistically arranged, and suffering it to float in the river. When an alligator has swallowed it, he is hauled on shore by the rope, and slaughtered.

Like the crocodile, the alligator lays its eggs in the sandy bank of the river. Fortunately, but few of the young ever reach maturity, as their ranks are thinned by various birds and beasts of prey before the eggs are hatched, and by the attacks of large fishes, and even their own species, when they have reached the water.

THE FROG.—The appearance and habits of the frog and the toad are so familiar as to require but little description. A short account, however, is necessary of the peculiarities common to both frogs and toads.

In the early stage of their existence, these animals are termed tadpoles. They at first appear to be nothing but head and tail, but after several days have passed, four legs are observed to become developed. These rapidly increase, and the little creature closely resembles a small eel. In due time, however, the tail is lost, and the creature becomes a perfect frog.

Another important change also takes place. In its tadpole state the creature was essentially a water animal, but after its change has taken place it is not able to exist under water for any great length of time, and is forced to come to the surface to breathe.

The tongue of the frog is curiously fixed almost at the entrance

of the mouth, and when at rest points backward down the throat. When, however, the frog comes within reach of a slug or insect, the tongue is darted out with exceeding rapidity, the slug secured, carried to the back of the throat, and swallowed.

Both frogs and toads hibernate, the former congregating in multitudes in the mud at the bottom of ponds and marshes, while the latter choose a hole in the ground, frequently at a root of a tree, and pass the winter in solitary dignity. In February, two frogs were dug out of the gravelled play-ground of Magdalen School. They were about a foot from the surface of the ground, and their habitation was quite smooth. Both were sitting with their mouths pointed upward, but I could not ascertain if there had been any communication with the open air. The skin of these animals has a property of imbibing water, so that if an apparently emaciated frog is placed in a damp place, it will soon look quite plump.

The Common Frog is a well-known frequenter of marshy places and the banks of rivers. It is an admirable swimmer, and from the peculiar construction of its lungs can remain for some time under water, but is forced periodically to come to the surface for the purpose of breathing.

The Bull-Frog is an inhabitant of North America. It is very voracious, feeding upon fishes, mollusks, and even young fowl. Its powers for leaping are so great, that an Indian was not able to overtake an irritated bull-frog after it had sprung three hops in advance. It is very large, measuring about seven inches in length.

The Tree Frogs are very peculiar animals. The construction of their feet, somewhat resembling that of the geckos, enables them to traverse the branches, and even to hang on the under surface of the pendent leaf, which it so resembles in color that the unwary insect passes by and is instantly seized by the watchful frog. The Green Tree Frog is the most common, and is plentifully found in

southern Europe and northern Africa. There are several specimens in the Zoological Gardens, which present a most absurd appearance as they stick against the pane of glass forming the front of their cage.

The COMMON TOAD has had its full share of marvellous tales. Its poisonous properties are celebrated in many an ancient chronicle, as are also the virtues of the jewel contained in its head. The skin certainly does secrete an acrid humor, which at all events defends it from dogs, who can seldom be induced to bite a toad a second time.

The well-known instances of imprisoned toads, who must have spent many years in their narrow habitation, are apparently explained by the supposition that some aperture or fissure existed, through which air and minute insects could pass, sufficient for their nourishment while in a semi-torpid condition. Certainly those experimented on by Dr. Buckland in 1865, and from whom all air was cut off, died before a year's imprisonment. The toad casts its skin at certain times, but we never find the slough as we do that of the snake, as the toad invariably swallows its former covering.

The NEWTS are separated from the lizards on account of their changes while young. Like the frogs, they are first tadpoles, and do not assume their perfect shape until six weeks after their exclusion from the eggs.

The Common Newt is a beautiful inhabitant of the ponds, ditches, and still waters. It feeds principally on tadpoles and worms, which it eats with a peculiar rapid snap. I have seen it attack the smaller newt with great perseverance, but I was never fortunate enough to see it kill its prey.

I kept some newts for some time in a large glass vessel, and noticed that when a new inhabitant was added, it always cast its skin within two or three days. The skin came off in pieces, the

covering of the feet slipping off like a glove ; but I could never see how the creature contrived to pull these glove-like relics off. It is constantly in the habit of rising to the surface of the water in order to breathe.

The newt has received the name of *Christatus*, or crested, on account of the beautiful crimson-tipped wavy crest of loose skin that extends along the whole course of the back and tail, and which,



THE TOAD.

together with a rich orange-colored belly, makes it a most beautiful creature. The female has a singular habit of laying her eggs upon long leaves of water-plants, and actually tying them in the leaf by a regular knot.

The *PROTEUS* is an extraordinary animal, which has been found in dark subterranean lakes, many hundred feet below the surface of the earth, where no rays of light can possibly enter. The eyes of this singular creature are mere points covered with skin, and useless for

vision ; indeed, when in captivity it always chooses the darkest parts of the vessel in which it is confined.

I have seen seven specimens of this strange creature which have lived for several years in a glass vessel covered with green baize in order to keep them in the dark. They have not been known to take any nourishment whatever during the time of their captivity, except the very trifling amount of nutrition that might have been obtained by changing the water.

The proteus breathes in two ways—by lungs and by gills, the latter organs appearing in the form of two tufts, one on each side of the neck, just above the fore limbs. The circulation of the blood in these branchial tufts can easily be seen with a microscope of moderate power. These tufts are of a rather deeper pink tinge than the remainder of the body, which is of a very pale flesh-color. Exposure to light darkens the tints both of gills and body.

The blood-disks of this animal are exceedingly large ; so large, indeed, as almost to be distinguished by the naked eye. When in captivity, its movements are slow and eel-like, nor does it seem to make much use of its almost rudimentary limbs.

It has usually been found on the soft mud of a small lake in the grotto of Maddalena. They have also been found at Sittich, thirty miles distant, thrown up from a subterranean cavity.

## FISHES.

As the FISHES live exclusively in the water, it is necessary that their organs of respiration should be differently formed from those of the animals breathing atmospheric air. Instead of the purification of the blood being accomplished by the contact of atmospheric air in the apparatus called lungs, that office is performed by the water, which passes into the mouth of the fish, and thence out at

the gillcovers, on its way being strained through the singular structure called the "gills." These gills are able to extract from the water sufficient oxygen to purify the blood of the fish. If the oxygen has already been extracted, the fish instantly dies. The same effect is produced if the fish be so held as to prevent the water from flowing in the proper direction, so that it is perfectly proper to drown a fish. Most anglers are perfectly aware of the power obtained by keeping the head of a hooked fish *down* the stream.

The elongated form of fishes, and their smooth covering, affording but little resistance to the water, beautifully show their perfect adaptation for the element in which they reside. Their rapid movements through the water are principally performed by means of a lateral vibration of the tail, just as a boat is sculled along by a single oar at the stern, or by a constant vibration of the rudder. The dead and mangled carcass of a flensed whale has been frequently known to swim for a considerable distance by the mere force of the muscular movements of the tail after death. The fins serve principally as balancers.

Most fish possess a singular organ called the "swimming-bladder." This is a membraneous pouch, varying exceedingly in size and shape, situated close under the spine, and filled by some means with gas, mostly found to be nitrogen, but in deep-sea fishes, an oxygen is discovered to exist. The fish seems to be able to rise or sink by means of compressing or expanding this pouch, without being forced to make use of its tail or fins.

Fishes are vastly more numerous than all the other vertebrates put together. Some are fitted to live in salt water only, some in fresh water only, while others live in both. Some live in one place and some wander from place to place in great bodies called schools. Those which inhabit shallow waters are of the brightest colors, due

mostly to the light, while those which live in deep water, where much light does not reach, are generally dull in color.

Most of the common fishes are told about under their own names, but there are a great many very singular fishes in the sea which we have not room to describe. For instance, in Central America is a fish called the dora or hassar, which leaves its pond when the water dries up and marches overland in large droves in search of more water, moving along by little leaps; and in Malabar is a small fish called the sennal which climbs up the trunks of palm trees growing near the water's edge. The archer-fish of Japan lives on insects which it shoots with a drop of water blown from its long snout.

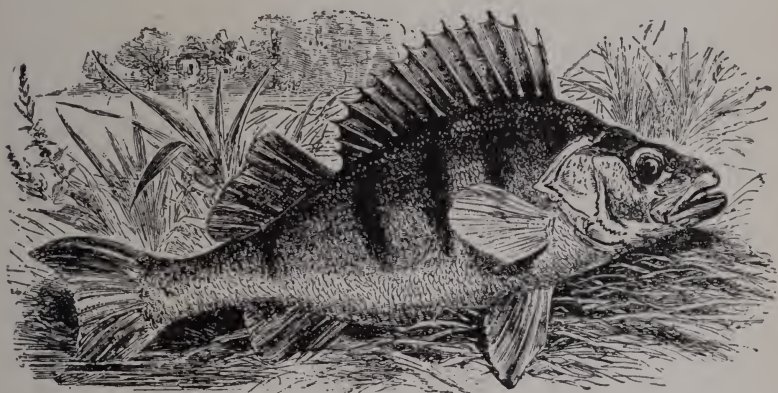
The smooth scaly covering with which most fish are furnished is admirably fitted both for defence against the water, and for enabling the fish to glide easily through places where a rough covering would have held it prisoner. Many valuable characteristics are derived from the shape of the scales in different fish.

The RED GURNARD, or CUCKOO GURNARD, as it is sometimes called from the sound it utters when taken out of the water, is very common on the English coast. It is rather a small fish, rarely exceeding fourteen inches in length. The colors of its body when living are very beautiful, the upper part being bright red, and the under parts silvery white.

The COMMON PERCH is well known to anglers both as a "bold biting fish," and as one that does not yield up its life without endangering the person of its captor; for the formidable row of spinous rays belonging to the first dorsal fin have wounded the hands of many an incautious angler.

It is extremely voracious, so much so that after all the legitimate bait has been exhausted, it is a common practice for the fisherman to place on his hook the eyes of the perch already taken, which are as eagerly bitten at as the worms were formerly. An anecdote is related of a gentleman who struck at a perch, but

unfortunately missed it, the hook tearing out the eye of the poor creature. He adjusted the eye on the hook, and replaced the line in the water, where it had hardly been a few minutes before the float was violently jerked under the surface. The angler of course struck, and found he had captured a fine perch. This when landed was discovered to be the very fish which had just been mutilated, and which had actually lost its life by devouring its own eye. It is quaintly observed by Izaak Walton, that "if there be twenty or



THE PERCH.

forty in a hole, they may be at one standing all caught one after another, they being like the wicked of the world, not afraid though their fellows and companions perish in their sight." The perch seldom exceeds two pounds and a half in weight, and a perch weighing a pound and a half is considered a very fine fish.

THE MACKEREL.—The elegant shape and resplendent colors of the mackerel point it out as one of the most beautiful fishes known. Nor is it only valuable for its beauty, as it is highly prized as an article of food in most parts of the world.

Vast shoals of mackerel visit our coasts, and myriads are taken by fishermen both by nets and with lines. The line of nets frequently exceeds a mile in extent, and of course the number of fish contained in this enormous net must be beyond all calculation. On several occasions, the meshes of the net were completely choked up by fish hanging by their gills, and the net acted like a dredge, sweeping up myriads more fish in a solid mass. In 1808, the whole net and its cargo sunk and were lost to the too successful fishermen.

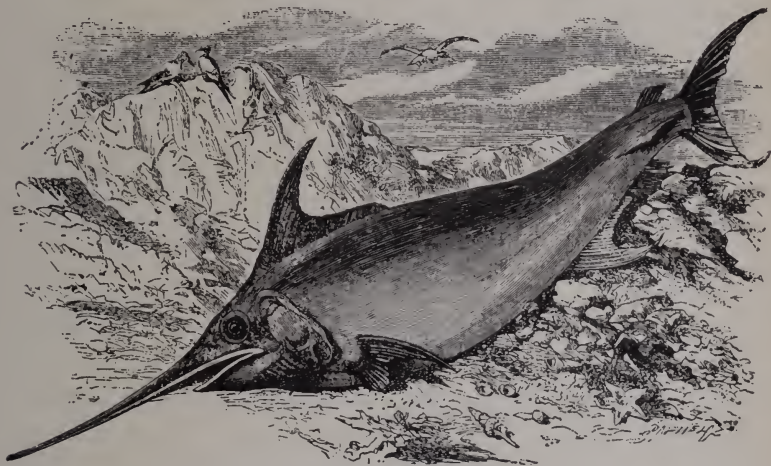
The TUNNY is a rather large fish, averaging four feet in length, and is very common in the Mediterranean. Large fisheries are established during May and June, at which season immense shoals of these fish rove along the coast.

THE SWORD-FISH.—The well-known sword-fish inhabits every part of the Mediterranean Sea, and has several times been seen near other shores.

The "sword" for which this fish is so famous is an elongation of the upper jaw, of great strength, and capable of doing considerable injury to any object against which it directs its attacks. In the British Museum is a portion of the bottom of a ship, pierced completely through by the "sword" of one of these fish. Its unfortunate owner must have instantly perished by the shock, for the sword was imbedded almost to its base, and broken short off. In one instance, a sword-fish attacked a whaling-ship, and drove its weapon "through the copper sheathing, an inch-board sheathing, a three-inch plank of hard wood, the solid white oak timber of the ship twelve inches thick, through another two-and-a-half inch hard oak ceiling plank, and lastly perforated the head of an oil-cask, where it still remained immovably fixed, so that not a single drop of oil escaped."

In the Mediterranean, the fishermen eagerly chase the sword-fish. The harpoon and line are used, much in the same manner as

in the whale fishery. The Sicilian fishermen have a strange superstition that if the sword-fish were to hear a word of Italian, it would instantly dive and escape them. They therefore restrict their vocal sounds to an unintelligible chant. It is said that the whale is an object of particular enmity to the sword-fish, and that ships are struck by it, being mistaken for whales. The length of the fish is



THE SWORD-FISH.

usually from twelve to fifteen feet. It is said to feed principally on tunnies, pursuing the shoals, and transfixing the fish with its sword.

The REMORA, or SUCKING-FISH, is remarkable for the peculiar apparatus situated on the upper part of its head. By this it can adhere to any object so firmly that it is a difficult matter to make it loose its hold. It is often found adhering to large fish or to the bottoms of ships, probably in both instances for the sake of the

fragments of food rejected by the one or thrown overboard from the other.

The older writers on Natural History fully believed that one remora had the power of arresting the largest ship in its course, and fixing it firmly in the same spot, in spite of spread canvas and swift gale. As the remora is about the same size as a herring, our ancestors naturally considered this a very curious circumstance, and wrote no few poems on the subject.

THE STICKLEBACK.—There are six species of sticklebacks known, the habits of all being very similar. They are most pugnacious little creatures, and will fight on the smallest provocation, dashing at each other and endeavoring to tear open their adversary's side with the sharp spikes that adorn their sides. The brilliant colors with which they are decorated only belong to the males, and not to them if they have been vanquished. In such a case, the conqueror looks more brilliant than before, and sails about with as much dignity as can be assumed by an animal an inch and a half in length. The unfortunate individual who has been defeated sneaks off into some corner, and soon loses his beautiful coloring, his crimson, green, and gold panoply changing into a very dull matter-of-fact gray.

The ANGLER, or FISHING FROG, as it is more generally called, is not uncommon in all the European seas. The peculiar formation of its pectoral fins enables it to crawl for some distance on land.

On its head are two elongated appendages, curiously articulated to the skull by a joint formed something like the links of a chain, and capable of movement in any direction. The angler crouches close to the bottom of the sea, and by the movement of its pectoral fins stirs up the sand and mud, and agitates the bony appendages amid the turbid cloud produced. The small fishes,

observing the muddy water and taking the filaments for worms, approach to seize them, and are instantly engulfed in the capacious jaws of the crafty angler. The voracity of the angler is so great that, when caught in a net together with other fish, it generally devours some of its fellow-prisoners—a useless act, for the fishermen mostly open its stomach, and recapture the flounders and other fish found in its interior.

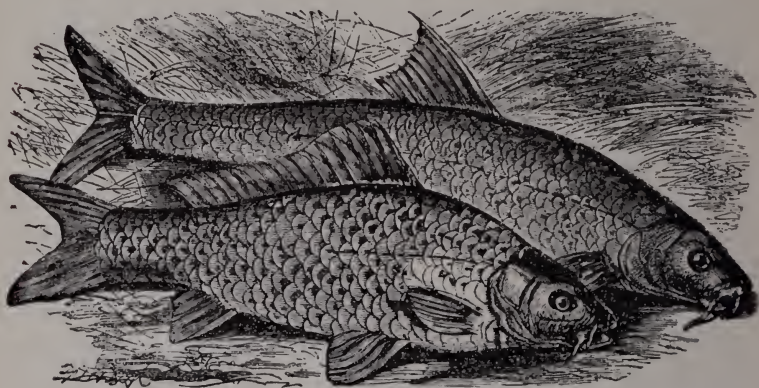
The COMMON CARP is a well-known inhabitant of our ponds, lakes, and sluggish rivers. It is a very shy and wary fish, rejecting one day a bait which had been freely taken the day previous. While fishing in a small pond I took in one hour six or seven carp, weighing from half a pound to nearly three pounds each. A few days afterward, although the weather was equally propitious, the carp were not, and the whole day was spent without even a bite. It lives to a great age, and when very old its scales turn gray, just as human hairs do. In several places in France numbers of carp were kept until they attained an enormous size. These great sluggish fish were accustomed to come to the water's edge in order to be fed at the call of their keeper. Feeding the carp was almost a hereditary amusement of the later kings of France.

Very few fish are so tenacious of life as the carp. It is the custom in Holland to keep these fish in nets filled with wet moss. They are fed with bread and milk, and are preserved in health by frequent immersion in water, in order to keep the moss thoroughly wet.

The SEA-HORSE is common in many European seas. The habits of this fish are very singular and interesting. A pair were kept alive for some time in a glass vessel and exhibited considerable activity and intelligence. They swam about with an undulating kind of movement, and frequently twined their tails round the weeds placed in their prison. Their eyes moved independently of

each other, like those of the chameleon, and the changeable tints of the head closely resemble that animal. More than once, these curious fish have been seen curled up in oyster shells. The singular creatures called Pipe-fish also belong to the same order.

THE GUDGEON.—This pretty little fish is usually found in shallow parts of rivers, where the bottom is gravelly. If the gravel is stirred up, the gudgeons immediately flock to the place, and a worm suspended amid the turbid water is eagerly snapped at by



THE CARP.

them. Its flesh is particularly delicate, and although its length rarely exceeds seven inches, yet from the ease with which numbers can be obtained, it forms a dish by no means to be despised.

THE TENCH.—The habits of the tench are not unlike those of the carp, except that it seems even more sluggish than that fish. It especially delights in muddy banks of ponds, where the weeds grow thickly. Roget gives an account of a tench that had been taken out of a pond almost filled with stones and rubbish, and which had

actually grown into the shape of the hole where it had been confined, evidently for many years. The weight of that fish was eleven pounds nine ounces. Four hundred tench and as many perch were also taken out of the same pond. This fish is even more tenacious of life than the carp.

The ROACH is very common in most rivers of this country, and is generally spread over the temperate parts of Europe. It is by no means a large fish, rarely exceeding two pounds in weight, and seldom attaining even that size. These fish usually live in small shoals, and pass from one part of the river to another.

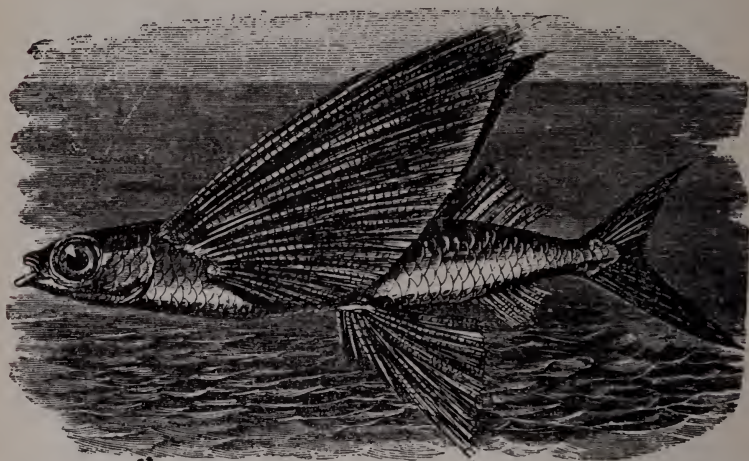
The roach is not unlike the dace, but may be easily distinguished by its bright red ventral fins, those of the dace being silvery white. It is rather a favorite with anglers, as it bites or rather nibbles at the bait in such a dainty and delicate manner that the disappointed fisherman not unfrequently finds the bait gone without the movement of his float betraying the theft.

The BLEAK and the MINNOW both belong to the genus *Leuciscus*. The former fish is remarkable for the use made of its scales, which when washed in water, deposit a powder much used in the manufacture of artificial pearls.

In some countries the LOACH goes by the name of "Beardie," in allusion to the little fleshy particles that hang from its lips. It has also the name of groundling, on account of its habit of living close to the bottom of the water. It is a common fish, and may be taken in most streams, especially if the bait is drawn over the bed of the stream. The principal peculiarity about the fish is the comparatively great breadth of the tail where it joins the spine. This formation, together with the generally pellucid appearance of its body, at once distinguish it from any other fish.

THE PIKE.—This fierce and voracious fish is now common in most rivers and lakes, although it was formerly so rare as to be rated at ten times the value of turbot.

The appetite of this fish is almost insatiable. Mr. Jesse threw to one pike of five pounds' weight four roach, each about four inches in length, which it devoured instantly, and swallowed a fifth within a quarter of an hour. Moor-hens, ducks, and even swans have been known to fall a prey to this voracious fish, its long teeth effectually keeping them prisoners under water until drowned.



THE FLYING-FISH.

THE FLYING-FISH.—This fish, so celebrated in most books of voyages, is found in the warmer latitudes, but has several times been seen off our coasts. The so-called "flight" is very similar to that of the flying squirrels and dragons, the fish merely springing out of the water with a violent impetus, and sustaining itself in the air by means of its enormous pectoral fins. It is not able to change its course while in the air, nor to rise a second time without repeating

its course through the water. The reader will notice the remarkable fact that individuals of three wingless classes, the Mammalia, the Reptiles, and the Fishes, have each the power of sustaining themselves in the air.

The "flight" of this fish seldom exceeds two hundred yards. The unfortunate creatures are pursued in the water by "dorados," erroneously called dolphins, and other fishes of prey. To escape their finny tyrants, they spring into the air, and for a while escape. But the gulls and albatrosses are on the watch, and pounce on the flying-fish from above, so that the persecuted creatures are tolerably sure to fall a prey to one or the other of their foes. The size of the fish is about the same as that of a herring. Its food is mollusks and small fishes.

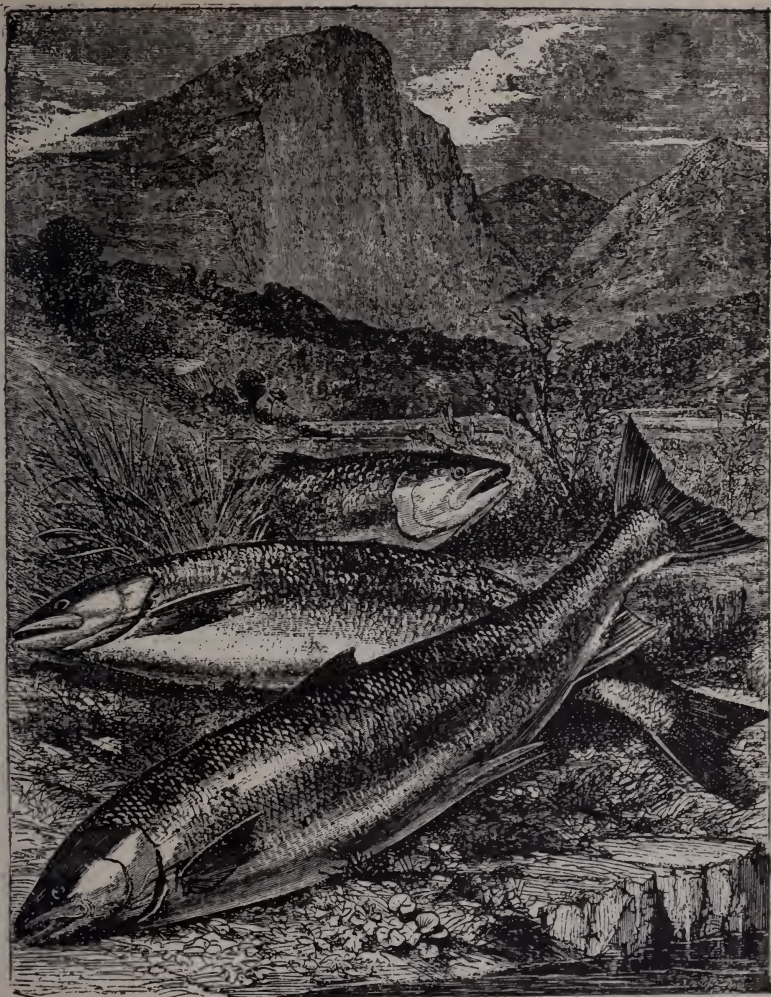
The SALMON is a migratory fish, annually leaving the sea, its proper residence, and proceeding for many miles up rivers, for the purpose of depositing its spawn. This duty having been accomplished, it returns to the sea in the spring. The perseverance of this fish in working its way up the stream is perfectly wonderful. No stream is rapid enough to daunt it, nor is it even checked by falls. These it surmounts by springing out of the water, fairly passing over the fall. Heights of fourteen or fifteen feet are constantly leaped by this powerful fish, and when it has arrived at the higher and shallower parts of the river, it scoops furrows in the gravelly bottom, and there deposits its spawn. The young, called "fry," are hatched about March, and immediately commence their retreat to the sea. By the end of May the young salmon, now called "smolts," have almost entirely deserted the rivers, and in June not one is to be found in fresh water. Small salmon weighing less than two pounds are termed "salmon peel;" all above that weight are called "grilse."

The COMMON TROUT is found in many rivers of this country, always preferring rapid, shallow, and sparkling streams, especially

if there should be little falls at intervals. The Derwent and the Dove are particularly famous for their trout. The latter river is quite the *beau ideal* of a trout stream. It never seems to know its own mind for half a mile together. Sometimes it is rapid, frisking over stones, and round trees, and throwing up the sparkling foam in all directions. Presently it has changed into a silent, slow, melancholy river, with dark pools of unknown depth, shaded by overhanging trees, and suggestive of murders successfully concealed. Everywhere are the trout. Lying quietly under the shelter of some large stone, while the water is leaping round them, are the moderate-sized trout, darting off like meteors to snatch at a passing fly, and as quickly returning to their concealment. In the deeper pools are the larger fish, who are too sagacious to be deceived by the artfully made fly of the professional angler, yet often fall victims to the less scientific but more successful ploughboy.

The usual method of fishing for trout is with a fly, but trolling with a minnow is often successfully used, nor does the trout reject a well-selected and properly arranged worm. The brilliant speckled tints of this beautiful fish vary much according to the locality and the time of year. In May the fish assume their brightest colors and their most delicate flavor. The size of the fish also varies exceedingly, being from half a pound in weight and about eight inches in length, to ten or fifteen pounds' weight. The smelt belongs to this family, and in its progress to the sea is destroyed in great quantities in mill-ponds, etc.

The value of the HERRING family to man is almost incalculable. The PILCHARD and the herring are very similar in appearance, but may be easily known by the position of the dorsal fin, which in the pilchard is so exactly in the centre of the body, that if the fish is held by it, the body exactly balances; while in the herring, the dorsal fin is placed rather backward, so that when suspended the fish hangs with its head downward.



THE SALMON.

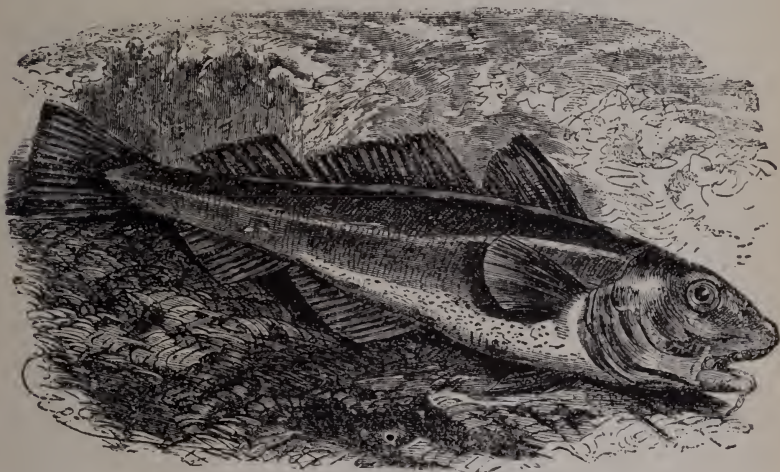
The herring makes its annual appearance on the coasts of America about June. This most valuable fish arrives in enormous shoals, five or six miles in length, and three or four in breadth. Their advent is heralded by various sea-birds, such as the gannets and gulls, which constantly hover over the shoals and commit unceasing devastation among them. Yet in spite of the myriads destroyed by birds and fishes, in spite of the shoals captured by man, in spite of the vast quantities of spawn devoured by other fishes, their numbers seem quite undiminished, and each year they are led by the instinct inculcated in them by Providence, to visit the shore in incalculable numbers, not only to yield to man an unfailing supply, but to make the necessary provision for the increase of their number.

The well-known SPRAT also belongs to the genus *Clupea*, and, like the herring, visits our shores in large shoals. The sprat fishery commences in the beginning of November. Not only are enormous quantities of this small but useful fish used as food, and sent into all parts of this country, but they are very largely used as manure—fish, according to the researches of Sir H. Davy, being a most powerful manure, retaining its fertilizing influence for a long time. Many thousand tons' weight of sprats are annually used for this purpose. The whitebait belongs to the same family.

The little ANCHOVY is a fish of no small importance, being very largely used in various sauces, besides the numbers that are preserved in pickle. It is common in the Mediterranean, and is also found on our coasts. The upper jaw of this fish is longer than the lower one; the entire length of the fish is usually from four to five inches, but it has been seen measuring upward of seven inches.

In the FLAT-FISH we see a most extraordinary instance of adaptation of structure to peculiar circumstances. We have all seen flat-fish, and all know that the upper side is dark, and the

under side nearly white. The word "side" is used advisedly, as these curious fish actually lie *on their sides* at the bottom of the water while undisturbed or merely feeding. When, however, they are alarmed, they rapidly assume the vertical position, and dart off with great speed. The dark upper surface serves to protect them from becoming too visible to enemies above. The two eyes are also



THE COD.

placed on the upper side of the head for obvious reasons. In fact, the whole fish appears as if it had been laid on its side, and rolled flat, the head also being twisted round, and the lower eye removed to the upper surface.

The COMMON SOLE is too well known to need much description. This fish is the reverse of the turbot, having the eyes and color on the right side, although, as in the turbot, varieties are not

rare. It is in season during most parts of the year, except a few weeks in March or April.

The TURBOT is found on the coasts of most parts of England, but the fisheries are nearly exclusively confined to the southern coasts of Ireland. The fishery is conducted both by nets and lines. On the coasts one turbot-line frequently extends for three miles in length, and is furnished with 2500 hooks, which are attached to the main line by small horse-hair lines, each twenty-seven inches in length. This enormous line is "shot" across the current at the turn of the tide.

THE COD.—In this sub-order the bones of the ventral fins are placed under, and support the bones of the shoulder.

The well-known codfish is principally found on the coasts of Newfoundland, but is taken in great numbers on our own shores. The hook is generally employed for the capture of this fine fish. Such is its voracity, that nearly five hundred have been taken by one man in the course of ten hours. The intense cold renders the cod fishery a service of great hardship. The fecundity of this fish is almost incredible, the roe of one fish having been ascertained to contain *nine million eggs*. The whiting belongs to this family.

The EELS form a sub-order of the Apoda, or footless fish, so called from the absence of ventral fins. These fish assume a form very similar to the serpents. Although on a hasty examination they seem to be devoid of scales, yet when the skin is dried, very minute scales may be seen through the semi-transparent outer skin, and may be easily detached by carefully separating the two skins.

Eels inhabit muddy ponds and rivers, and are common in many canals.

THE ELECTRIC EEL.—This curious fish, which exhibits the singular phenomenon of voluntary electric power residing in a living animal, is an inhabitant of the fresh-water rivers and ponds of

Surinam, and other parts of South America, where it was first discovered in the year 1677.

This power of emitting an electric shock is apparently given it in order to enable the creature to kill its prey. Those who have seen the electric eel in the Polytechnic while being fed, will have little doubt of this. The fish given to it are, directly it becomes aware of their presence, instantly struck dead and then devoured. This specimen is unfortunately blind, but it has learned to turn in the direction of a paddling in the water, made by the individual who feeds it. The fish is scarcely in the water before the shock from the *gymnotus* kills it. The usual length of the *gymnotus* is about three feet.

THE SHORT SUN-FISH.—This order derives its name from the curious structure of the jaws, which are fixed together in a very peculiar manner. It is of a most singular shape, looking as if three fourths of a very large fish had been cut off, leaving only the head and shoulders. It attains to a very large size, and has been known to weigh three hundred pounds, its length being only four feet five inches. It lives mostly at the bottom of the sea, but frequently rises to the surface, and lies, perhaps sleeps, floating with the tide.

THE STURGEON.—The remaining fishes belong to the Cartilaginous sub-class; that is, their skeletons are composed of cartilage, and not of true bone. The first sub-order possess free gill-covers, like those of all the preceding fish; but the remainder breathe by means either of slits, as in the sharks, or holes, as in the lampreys. The sturgeon is remarkable for the rows of bony plates extending along the body. It is exceedingly common in the northern parts of Europe and in North America, where regular fisheries are organized for its capture. Almost every part of it is used. Isinglass is obtained by drying and shredding the air-bladder; caviare is made of the roe of the female, and the flesh is extensively preserved both

by pickling and salting, besides the large quantities that are consumed fresh. The flavor of its flesh is said not to be unlike veal.

A specimen was once caught in the Esk, weighing four hundred and sixty pounds. The female always deposits her eggs in fresh water, and the young, when hatched, descend to the sea, and are supposed not to return again until, in their turn, they seek the fresh water in order to deposit their spawn.

The SHARKS and RAYS have no gill-covers, but the water passes through five elongated apertures on each side of the head. The sharks are proverbially ferocious and dangerous creatures, and are the pest of those seas which they infest. Their mouths are furnished with several rows of sharp, jagged teeth, which can be raised or depressed at pleasure, and which can cut through a limb or even the body of a man with the greatest ease. The mouth of these fishes is placed beneath the head, so that a shark cannot seize its prey at the surface of the water without turning on its side, which evolution often gives time for its expected prey to escape.

The little Spotted Dogfish is the most common of the sharks that visit our shores. It is principally known on account of the havoc it makes among the fish during the seasons of the various fisheries, for which reason it is most especially detested by the unfortunate fishermen, who not unfrequently, together with their expected spoil, draw up a few dogfish in their nets. The dogfish, on finding themselves entangled, immediately commence tearing the nets to pieces with their sharp and powerful teeth.

The empty eggs of this fish are often found washed up on the sea-shore, and called by the name of "mermaids' purses."

The White Shark is a well-known scourge of the Mediterranean Sea and the Atlantic Ocean. This is the creature so detested by sailors, who, when they have caught a "shark," subject it to every possible indignity. This voracious creature has been known



THE WHITE SHARK.

to swallow an entire man, and as it is in the habit of lurking about ships for the sake of the scraps thrown overboard, and almost invariably swallows whatever is cast over the side, the contents of its stomach are often of a most heterogeneous description. The sailors always amuse themselves by seeing what the shark has "stowed away," and the substances thus brought to light have been most curious. The entire contents of a lady's work-basket, down to the scissors, were found in the interior of one shark, and another had actually swallowed an entire bull's hide—a circumstance which led the operating sailor to remark that the shark had swallowed a bull, but could not "digest" the hide.

The SAWFISH is found in the greatest perfection in the tropical seas, although it also inhabits the Mediterranean. The weapon from which the fish derives its name is a flat, long prolongation of the head, on each edge of which are set hard tooth-like projections, curiously inserted into the bone. This fish has been known to employ its saw in the attack on the whale, burying the apparently inappropriate weapon to the very root in the body of the whale; nor are instances wanting where the saw has been found firmly imbedded in the hull of a ship.

The TORPEDO may fairly be considered a British fish. It affords a second instance of the electric power residing in a fish. The organs that produce the electric shock are shown externally by two elevations extending from the eyes about half way down the body. Although it has once or twice been caught on our coasts, it is usually found in the Mediterranean, where its powers are well known, and held in some awe. The shock that the torpedo gives, of course, varies according to the size of the fish, and its state of health, but a tolerably large fish in good health can, for the time, disable a strong man. From the effects of its shock, it is in some parts called the cramp-fish.

The RAYS are at first sight not unlike the turbot and sole, but a closer examination will show that the rays really swim with their backs upward, whereas the turbot swims on its side. The movement of the ray is very curious.

The Skate is caught in abundance on our shores, and in England is in much request as an article of food, although by many it is used principally for bait. The Thornback Skate derives its name from the spiny armature of the tail, with which the fish defends itself most vigorously by bending itself almost into a semicircle and lashing about with its tail. The female of the thornback skate is termed a maid. It often attains to a large size, the largest known being twelve feet in length, and nearly ten in width. The jaws of the rays are exceedingly powerful, and enable them to crush with perfect ease the various shell-fish on which they feed. The Sting Ray is another species, which is armed with a serrated bone in its tail, with which it can inflict painful and even dangerous wounds.

THE LAMPREY.—These curious fishes, in many respects the lowest in organization of the vertebrated animals, are chiefly remarkable for the singular construction of the mouth, which, formed like that of the leech, enables the lampreys to hold firmly to any object by suction. The breathing apparatus appears externally to consist of fourteen small apertures, seven on each side of the neck. Their progress through the water is accomplished by a rapid undulating movement.

The Marine Lamprey is found in the Mediterranean, and in most of the northern European rivers. It has also been discovered in America. Like many other fishes, it travels for many miles up rivers for the purpose of depositing its spawn, at which time it is considered to be in the highest perfection. The spawn is deposited in furrows, some excavated by the parent lampreys, who, by the

help of their sucker-like mouths, rapidly remove even large stones.

The Lamprey, or River Lamprey, is plentifully found in many rivers of America. Its length is usually from twelve to fifteen inches. In some counties of England it is called seven-eyes, in allusion to the breathing apertures in the neck.

The MYXINE, which, although a decided fish, was classed by Linnæus among the worms, occurs frequently on the eastern coasts of this country. The fishermen find it within the bodies of fish attached to the lines. The Scarborough fishermen call such fish "robbed," as the myxine, in the course of a single tide, will devour the whole fish, except the skin and bones. The length of the myxine is from twelve to fifteen inches.

### MOLLUSCS.

The MOLLUSCA have neither spine nor bones, the nervous system consisting of a number of nervous knobs called "ganglia," which give off filamentous nerves in different directions. Few molluscs possess eyes, but in one or two, as the snails and slugs, these organs are to be found, and in the higher molluscs, such as the cuttlefish, we see not only large and brilliant eyes, but also organs of hearing.

The CEPHALOPODA, so called from the organs of movement surrounding the head, are divided into *naked* and *testaceous*, or covered with a shell.

The COMMON CUTTLEFISH is an example of a naked cephalopodous mollusc. This repulsive-looking creature is common on our shores, and is, in spite of its unpleasant appearance, often used for food. Its eight long and flexible arms are covered with suckers of various sizes, enabling their owner not only to fix itself firmly to the rocks on which it dwells, but to seize and retain with the greatest tenacity any unfortunate fish or shell that may happen to come

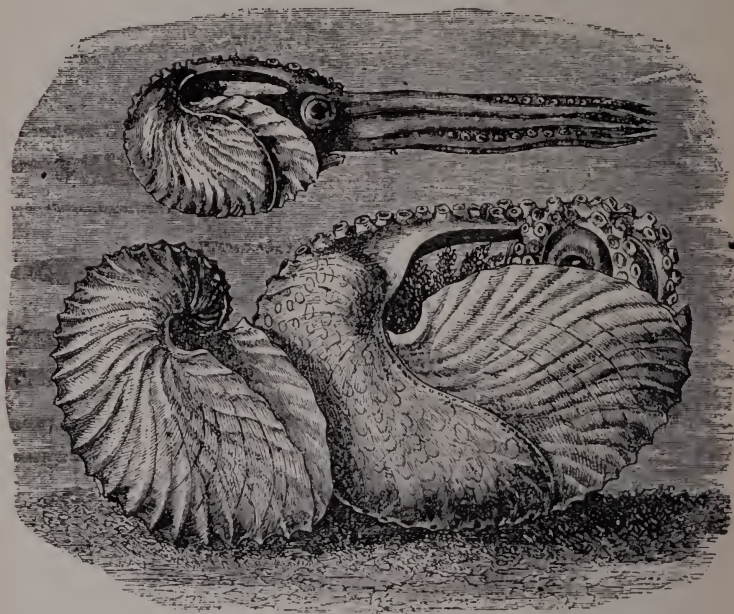
within its reach. Its powerful parrot-like beak enables it not only to devour fishes, but even to crush the shells and crustacea that are entangled in its deadly embrace. In this country, the cuttle does not grow to any great size, but in the Indian Seas it is absolutely dangerous, and the crews of boats are forced to be armed with a hatchet, to cut off the arms of the cuttlefish.

There are few who have not heard of the color "sepia." This is, or ought to be, prepared from a black pigment, secreted by the cuttlefish, and used in order to escape its foes, by blackening the water with the ink, and hurrying off under shelter of the dense cloud of its own creating. Dr. Buckland actually drew a portrait of a fossil cuttlefish with some of its own ink that still remained in its body. The substance sold in the shops as cuttlefish bone is a chalky substance secreted from the mouth of the fish, and composed of an infinite number of plates, joined by myriads of little pillars. The entire body is soft, and encased in a coarse, leather-like skin, unprotected by any shell.

The SQUID is much like the cuttlefish in looks. The common squid, found on the coast of New England, is six to twelve inches long, but very large ones have been found off the coast of Newfoundland. In 1872 one was seen whose body was nearly twice as long as a man, while its arms were five times as long as a man. It is thought that some of them grow to be at least fifty feet long. such ones are very strong and dangerous. The "devil-fish" told about by Victor Hugo in his book called "The Toilers of the Sea," which catches a man and draws him down into his cave, is something like an octopus, but there is really no such animal in the world as the one he describes.

The principal eight-arm cephalopods are the OCTOPUS, or POULPE and the ARGONAUT. The common octopus, found in the European seas, has a round body about as large as a man's fist,

with eight arms around it, each three or four feet long. Near the body these arms are joined by a tough skin, by opening and shutting which it can swim backward. It has also a tube which opens near its mouth, through which it blows out water, which helps it to



THE ARGONAUT, OR PAPER NAUTILUS.

swim in other ways. It can walk on its eight arms in the same way with the cuttlefish. In the seas of hot countries the octopus grows very large.

The ARGONAUT, or NAUTILUS, is an example of the testaceous molluscs. This curious creature, about which so many marvellous

and poetical tales have been told, is very abundant in the Mediterranean. It has been clearly proved that the nautilus does *not* urge itself along the surface of the water by the expanded arms used as sails. These arms are in fact used to cover the shell, and it is from these that the beautiful shell is secreted. The argonaut propels itself through the sea by violently ejecting water from the tube with which it, as well as the cuttlefish, is furnished for that purpose. The colors of the living animal of the nautilus are exceedingly beautiful.

The arms of this creature are furnished with suckers. Its shell, when the poulpe (as the living argonaut is called) is still existing, is flexible and semi-transparent; but when the animal is taken away, the shell soon becomes rather opaque, and is very fragile.

The SLUGS are well-known invaders of our gardens, and, together with the snail, the caterpillar, and the mysterious "blight," are objects of the gardener's most intense hatred. The black slug is usually found by hedge-banks and in grassy meadows. It seldom ventures out by day, especially if the day be bright; but at night, when the dew is on the ground, it may be seen trailing its dark length through the herbage, or eagerly devouring the leaves.

THE COMMON SNAIL.—Several species of snails inhabit this country, among which the edible snail, the belted snail, and the common garden snail are the most conspicuous. The edible snail was imported into England by the Romans, who prized them highly, and fattened them in a building erected for that express purpose, as indeed is now done in some parts of Europe. This snail grows to a large size, nearly attaining the magnitude of an ordinary closed fist.

The eyes of the snail are placed at the extremity of the tentacula, or "horns," as they are usually called. The common garden

snail is so well known that no description of it is needed. It lays eggs very large in comparison with the size of the parent; they are about the size of small peas, round, soft, and semi-transparent. They are deposited about two inches below the surface of the earth.

The beautiful THORNY WOODCOCK, sometimes called by the name of Venus's comb, is an excellent example of the Muricidæ. This elegant shell is an inhabitant of the Indian Ocean.

The ROYAL STAIRCASE WENTLETRAP affords us an excellent and most beautiful example of the Turbinidæ. It is a native of the Chinese and Indian seas, and was formerly so scarce that a specimen two inches in length would sell for five hundred dollars. Even now, a very fine specimen cannot be obtained under thirty or thirty-five dollars. For this reason, the specific name "*pretiosa*" was affixed to it by Lamarck.

As an example of the large family of CONES, we will take the common cone, whose beautiful marbled color and elegant shape render it a most attractive shell.

THE MONEY COWRIE AND THE WHELK.—The cowries are not less celebrated for the elegance of their form, and the beauty of their markings, than for the curious circumstance that one species is used as current coin in Guinea and Bengal, thus being employed for the same purpose by two entirely distinct races of men, situated in different quarters of the globe. Their value is of course small in proportion to gold or silver. At the present time a rupee in Bengal is worth 3200 cowries, the value of the rupee being about thirty cents of our money.

The LIMPETS are spread over every latitude, except the Arctic regions. The common limpet is to be found on every rock and large stone at the sea-side. The mode of its attachment to the rocks is very curious, and well repays a careful examination.

We now arrive at the BIVALVE MOLLUSCS. It has been already stated that the bivalves are all aquatic. These creatures are enabled to keep their shell firmly closed by means of a powerful muscle. Those who have attempted for the first time to open an oyster, must



THE OYSTER.

be convinced of the strength of this muscle. The two shells are united by a powerful elastic hinge, which after the death of the animal opens the shells widely.

The bivalves do not enjoy such powers of locomotion as the univalves, yet some, as the fresh-water mussel, can urge themselves

along by means of a fleshy organ called the foot ; and so powerful in some is this organ, that by means of it the animal can not only burrow in the sand, but actually leap out of a boat. The rapid opening and shutting of the valves is used by some, as the scallop, as a means of progression. It is believed that the bivalves have no visual organs.

The common SCALLOP is found along our southern coasts, and in the seas of Europe. This shell was formerly used as the badge of a Pilgrim to the Holy Land.

The COMMON OYSTER has been for many ages considered as a delicacy for the table. In the times of the ancient Romans, we find that English "native oysters" were exported to Rome, and then placed in the Lucrine Lake, where they were fattened.

On our coasts the oysters breed in large beds, to which vast quantities of young oysters are conveyed by the fishermen, and suffered to increase without molestation. During the months of May, June, and July, the oysters breed, and are considered unfit for food. At this time the young, called "spat," are deposited in enormous numbers. They instantly adhere to the substance among which they fall ; and this, whatever it be, is called "cultch," and is protected by severe penalties. About May the fishermen separate the spawn from the cultch, which is then thrown back into its former place. After May it is felony to disturb the cultch, as were it removed, mussels and cockles would rapidly take the place of the oysters.

The oysters are taken in the proper season by the "dredge," a kind of small net fastened round an iron framework, which scoops up the oysters and many other marine animals. The part of the oysters called the "beard" is in reality the respiratory apparatus.

The SEA MUSSELS are usually fixed where the tide leaves them alternately wet and dry, and it is worthy of notice that those "shell-

fish" which are exposed to variations of this kind are enabled to close their shells so firmly as to prevent any evaporation. One species is extensively used as an article of food. The river mussels occasionally produce pearls of some value. The nacre of these mussels is of a beautiful azure blue.

The BARNACLE is always found adhering to some larger object, usually floating wood, and is very common on the hulls of ships. Although the perfect animal is permanently fixed, it has been discovered that the young are free and capable of locomotion; nor is it until a week or two has passed that they finally settle themselves.

The CRUSTACEA are almost all aquatic animals. They have no internal skeleton, but their body is covered with a strong crust, which serves for protection as well as for strength. Their whole framework consists of a series of rings fitted to and working in each other; some forming limbs, and others developing into the framework supporting the different organs. From this reason they and the remaining animals, as far as the star-fishes, who have no limbs at all, are called "articulated" animals.

Their method of growth is very curious. Other animals, as they increase in size, experience no particular inconvenience. Not so the crustacea. Their bodies are closely enveloped in a strong, unyielding mail, which cannot grow with them. Their armor is therefore cast off every year, and a fresh coat formed to suit their increased dimensions. Not only is the armor cast off, but even the covering of the eyes, the tendons of the claws, and *lining membrane of the stomach, with its teeth*. They all possess the curious power of reproducing a lost or injured limb. In the former case, a fresh limb supplies the place of that lost; and in the latter case, the animal itself shakes off the injured joint, and a new one soon takes its place. Lobsters, when alarmed, frequently throw off their claws.

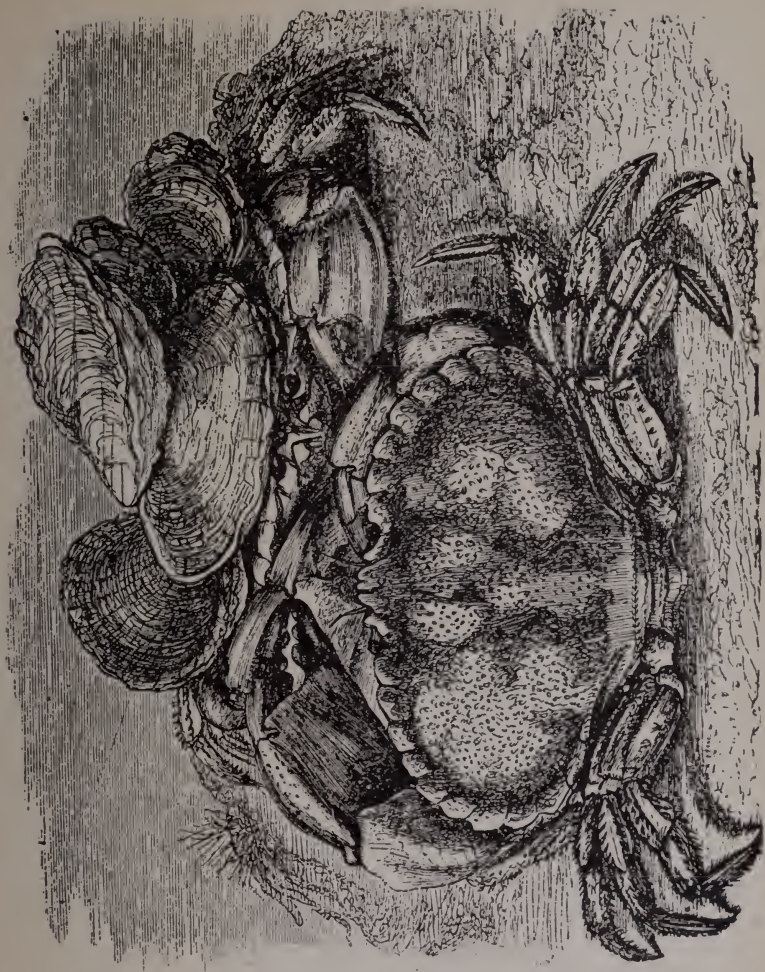
The Decapods are the fortunate possessors of ten legs, five at each side. They also possess three pairs of jaws, besides the teeth

in the stomach. They breathe by means of branchiæ or gills, fixed at each side of the throat or chest, often erroneously called the head.

The COMMON CRAB belongs to the short-tailed Decapods. It is abundantly taken on our coasts by fishermen, who employ for its capture a wicker basket called a "creel" or crab-pot. The crab-pots are made each with an aperture which permits the animal to enter, but forbids its egress—just like a common wire mouse-trap. A piece of a fish is fastened at the bottom of the creel, and the whole apparatus let down to the bottom of the sea, guarded by a line connected with a float, by means of which the fishermen draw it up and then remove its contents. Each float has a peculiar mark, by which the fisherman knows his own. When taken, the crabs are kept alive in well-boats, until wanted.

The HERMIT CRAB is not so well protected as most of his relations, for his tail has no shelly armor. He is therefore forced to protect his undefended tail by putting it into an empty shell, usually that of a whelk, and then walks about, dragging his curious house after him. Sometimes, two hermit crabs wish to obtain possession of the same shell, and then there is a battle royal. When the crab grows larger, he only has to change his old shell for a new one, and it is very amusing to see these creatures slipping their tails first into one shell, and then into another, until they have pleased themselves with a good fit.

The COMMON LOBSTER is found in great abundance on our coast, usually in the clear, rocky waters. The grasp of its claw is so tight, that to break off the claws is often the only method of disengaging its hold. Although enormous quantities are destroyed every year, they are so prolific that the supply never fails. The so-called lady's-fingers of the lobster are its breathing apparatus.



THE EDIBLE CRAB.

STAR-FISHES.—These creatures exhibit in the strongest manner the radiate form of body, the various organs boldly radiating from a common centre.

Many of these creatures are exceedingly common upon our own coasts, so plentiful, indeed, as to be intensely hated by the fishermen. Of these the common Five-fingered Jack, often seen on the New England coast, is perhaps found in the greatest number. All star-fishes are very wonderful beings, and well repay a close and lengthened examination of their habits, their development, and their anatomy.

The movements of the star-fish are extremely graceful, the creature gliding onward with a beautifully smooth and regular motion. It always manages to accommodate itself to the surface over which it is passing, never bridging over even a slight depression, but exactly following all the equalities of the ground. It can also pass through a very narrow opening, and does so by pushing one ray in front, and folding the others back so that they may afford no obstacle to the passage. It also has an odd habit of pressing the points of its rays upon the bottom of the sea, and raising itself in the middle so as to resemble a five-legged stool.

The SHIP-WORM, as this mollusc is appropriately called, from its depredations on the bottoms of the ships and all submerged wooden structures, is found in most seas, and on our own coasts works fearful damage by eating into piles, planks, or even loose wood that lies tossing about in the ocean. I have now before me a portion of the pier at Yarmouth, which is so honeycombed by this terrible creature that it can be crushed between the hands as if it were paper, and in many places the wood is not thicker than ordinary foolscap. The burrow which the creature forms is either wholly or partially lined with shell, and it is worthy of notice that the ship-worm and its mode of burrowing was the object that gave Sir I. Brunel the idea of the Thames Tunnel.

The PRAWN and the SHRIMP are so familiar to every one as to need but little description. Both are taken in nets swept along the sandy bottom of the sea. The chief distinction in the appearance of these two creatures is the serrated or toothed ridge which runs along the back of the head, or rather carapace, of the prawn. When in their natural state, they are of a brown color, and only assume the pinkish hue when boiled. The Fresh-water Shrimp and the Water-flea are placed among the Crustacea.

### SPIDERS.

The Class ARACHNIDA, or the Spiders, are by many supposed to be insects. Such, however, is not the case. Spiders possess eight legs, while the true Insects only have six; they undergo no transformations, they possess no wings or antennæ (the place of the latter organs being supplied either by two jointed claws, as in the Scorpions, or by two fangs, as in the Spiders); and their eyes are simple instead of compound.

Could people divest themselves of the horror felt at the sight of these creatures, especially of the largersort, they would be well repaid by the interesting instinct displayed by all the spiders, who do not differ from each other more in form than in habits. Those of our own country afford an ample field, which had been as yet but imperfectly trodden. There are the Gossamer Spiders, who float high unto the air, borne upon an almost invisible thread; the Water Spiders, who form an air-tight dwelling under the wave; the Hunting Spiders, that creep stealthily upon their prey, and then spring on it like lightning; the beautiful Garden Spiders, who wave from their self-afforded stores their geometrical nets; the Pirate Spiders, who skim over the surface of the waters, and snatch up the drowning and helpless fly; together with many others, whose form and habits must be familiar to any ob-

server of nature. On account of the limited space that can be appropriated to each class, a short account of some of the principal species of this class is all that can be given.

The common Garden or Geometrical Spider, as it is called from the mathematical regularity of its net, is an excellent example of the spiders. The net is formed from a gummy substance secreted in an apparatus called the spinneret, through the holes of which



THE GARDEN SPIDER.

the gummy secretion is drawn, and becomes hard when exposed to the air. Each thread is composed of many thousand lines. When the web is completed, the spider generally hides itself under a leaf or other convenient lurking-place, and from thence pounces upon any unwary fly that has entangled itself in the slender meshes. Should the fly be a large one, the spider rapidly encircles it with fresh threads until it has bound its wings and legs to the body, and

then breaking off the few threads that held it to the net, bears it off triumphantly to its hiding-place. Frequently the geometrical spider sits in the centre of the web, apparently enjoying the air, and if disturbed shakes the net so violently that its shape is completely obscured by the rapidity of the vibrations.

The House Spider makes a thicker and irregular web, and hides at the bottom of a silken tunnel communicating with the web. An acquaintance of mine had so far tamed a huge house spider, that it would come and take a fly out of his hand. He states that, as it sat at the bottom of its den, its eyes gleamed like diamonds.

Many efforts have been made to procure silk from spiders, but although a sufficient quantity has been obtained to weave gloves from, yet spiders are so pugnacious that they cannot be kept together. The eggs of the spiders are enclosed in a silken bag, and when hatched, the young keep closely together, and when dispersed by an alarm, soon reassemble.

The TARANTULA whose bite was fabled to produce convulsions which could only be appeased by music, is a spider of considerable size, inhabiting the south of Europe. It lives in holes about four inches deep in the ground.

THE SCORPION.—These formidable creatures inhabit most of the hotter parts of the globe. They are quite as pugnacious as the spiders, and if several are placed in one box, they will fight until few survive, who immediately devour their fallen foes. The maxillæ of the scorpion are developed into large claws, like those of the lobster. With these the scorpion seizes its prey, and while holding it pierces it with its sting, which is situated at the extremity of its tail. The tail is composed of six joints, rendering it very flexible. The sting of this creature is exceedingly painful, and with some persons dangerous; indeed, the sting of the large black scorpion of Ceylon is said to cause death.

THE HARVEST-BUG.—These creatures are mostly minute, requiring the aid of a microscope fully to develop their form; but some are considerably larger, and their organs can be distinguished with the naked eye. In this order are included the common cheese-mite, the harvest-bug, the water mites, etc.

## INSECTS.

The body of an insect is divided or *cut into* three parts, called the head, the thorax, and the abdomen. The body is defended by a horny integument, divided into rings, and connected by a softer membrane. The legs are six in number. Many insects possess wings, and in all the rudiments of those organs are perceptible. The eyes are compound, that is, a number of eyes are massed together at each side of the head; and so numerous are they, that in the compound eyes of the ant are 50 lenses, in the house-fly, 8000, in the butterfly, 17,000, and in the hawk-moth, 20,000.

The insects pass through three transformations before they attain their perfect form. The first state is called the *larva*, because the future insect is masked under that form; the second is called the *pupa*, on account of the shape often assumed; and the third is called the *imago*, as being the image of the perfect creature.

Insects breathe by means of air-tubes, called tracheæ, which penetrate to every part of the body, even to the extremities of the limbs, antennæ and wings. The air gains access to the tubes by means of small apertures called spiracles. The tubes are prevented from collapsing by a delicate thread wound spirally between the two membranes of which the tubes are composed. This wonderful and beautiful arrangement not only prevents the tubes from collapsing, but keeps them flexible.

There are, according to Stephens, whose arrangement is the one usually followed, fourteen orders of insects. Examples will be

given of each, and their names explained. The most perfect insects are placed first.

There are two great divisions of insects, namely, those which bite and eat solid food with jaws, as the beetles, locusts, bees, etc., and those which suck liquid food through a proboscis, as the butterflies, flies, etc. The first order of insects derives its name from the sheath or covering with which the wings are defended. This is a very extensive order.

Beetles may be known from other insects by the two horny sheaths or wing-covers called *elytra*, which cover their true wings so closely when they are not flying that they look as if they had no wings.

Tiger Beetles are so called from their stripes and because they are as fierce among insects as tigers are among quadrupeds. They prey on caterpillars, flies, and other beetles, and will even eat each other when shut up together. The Bombardier Beetle is so called from its habit of shooting a strong liquid from behind at its enemies—bombard being an old name for a cannon. Scavenger Beetles have feet fitted for digging, and make deep holes in the ground. They live on filth, of which they clear up a great deal. Some of them are called Carrion Beetles because they eat up dead animals. Others, called Sexton Beetles, bury the bodies of animals.

Other wonderful beetles are the Stag-horn Beetles, whose long jaws look like the horns of a stag. Our common Horn Bug belongs to this class. In some countries this kind of beetle is very useful in clearing up dead wood in forests. They lay their eggs in the bark of trees blown down by tempests, and their grubs eat up the whole tree, which is thus turned to dust and enriches the earth.

The Spring Beetles or Snapping Bug is so called because when laid on its back it can spring up, turn over, and come down on its feet. Weevils are a kind of beetles that live on fruits and grains,

and do great injury to crops. The worms found in plums, apples, chestnuts, and other fruit come from eggs laid in them by beetles. The Spanish Fly, which is ground to powder and made into blistering plasters, is a bright green beetle. *Fireflies* or Lightning Bugs, *Lady-birds*, Potato Bugs, Squash Bugs, June Bugs, and many other common insects are also beetles.

The cockchaffer needs not much description. Its larva works great mischief during the spring, as it feeds on the roots of plants, and cuts them off with its sharp sickle-like jaws. Where many of these "grubs" have been, the grass curls up and dries like hay. One farmer actually collected eighty bushels of the grubs of the cockchaffer on his farm. Fortunately the thrushes, blackbirds, rooks, and many other birds, are inveterate destroyers of the grubs, and devour myriads of them. It is for this purpose that these birds pull up the grass, and not to spoil or devour the herbage, as is generally supposed.

The Huge Hercules and Atlas Beetles, and larger still, the Goliath Beetle, belong to the Lamellicorns.

The Glow-worm may be seen in the warm summer evenings, shedding its pale green light on grassy banks. The female insect gives out a much stronger light than the male, and there is some light visible even in the larva. The light of this insect proceeds from the abdomen. The light given out by the firefly, another kind of beetle inhabiting South America, proceeds from three yellow tubercles placed on the throat. The grub or larva of the glow-worm is of a singular form, and is furnished with a brush at the extremity of the tail, with which it cleanses its body from dust or the slime of the snails on which it frequently feeds.

THE MUSK-BEETLE.—The beautiful beetles, of which the common musk-beetle is an excellent example, vary considerably in size; some being several inches in length, while some are hardly



THE BEETLE.

one-quarter of an inch long. The extreme length of their antennæ is the most conspicuous property, and from that peculiarity they are at once recognized.

The musk-beetle is a large insect. Its peculiar scent, something resembling that of roses, often betrays its presence, when its green color would have kept it concealed. When touched, it emits a curious sound, not unlike that of the bat, but more resembling the faint scratching of a perpendicularly-held slate-pencil. Its larva bores deep holes in the trees, which are often quite honeycombed by them.

The Rove-beetles form an exceedingly extensive section. Some are so small as to require the assistance of the microscope to discover their shape, and others are more than an inch in length. The small species are usually on the wing, and it is very amusing to see them alight, and with their flexible tails tuck their long and beautifully-shaped wings under the elytra, run about for a moment, and then again take to flight. These are the creatures that cause so much annoyance by flying into one's mouth or eye in the warm months.

The Great Rove-beetle is commonly found upon decaying animal substances. It is most formidably armed with two large, curved, sharp mandibles, the bite of which is tolerably severe; and more than once, when the creature has been recently feeding upon putrid substances, dangerous results have followed.

Water-beetles inhabit the water, and swim with remarkable activity. They occasionally come to the surface for a fresh supply of air, which they carry down between the elytra and the upper surface of the abdomen. They fly very well, but the construction of their limbs prevents them from walking. They cannot be kept in a limited space, as they are very fierce and voracious, and in one case, when a male and female were placed in a jar filled with

water, only one day elapsed before the male was found dead and half devoured by his disconsolate widow.

The EARWIG is placed in an order by itself. The wings are large and exceedingly beautiful, and the method of folding by which they are packed under the very small elytra is very curious. The use of the forceps seems principally for the purpose of folding the wings and placing them in their proper position under their cases. The eggs of the earwigs are hatched, and the young protected by the parent.

THE LOCUST.—These pests of the warmer countries of the earth belong to the order called Orthoptera, because the wings are not folded transversely. They fly in countless myriads, and where they descend, they devour every particle of green herbage—the trees are stripped of their leaves, the grass and corn is eaten to the very ground; for their jaws are so strong as to inflict a severe wound when the insect is incautiously handled.

Nor does the mischief end with their life, for their dead bodies often accumulate in such numbers that the air is even dangerously infected. They infest Africa and Central Asia, but they annually make incursions to Europe and America, where the damage they occasion is much less reparable than in their native land; for there the power of vegetation is so great that a few days repair the injuries caused by them, but in Europe a whole year is required for that purpose.

Our common grasshoppers belong to this order, but require no description.

THE HOUSE CRICKET.—This well-known insect delights to live in places that are always warm, and consequently is found swarming about ovens, kitchen fireplaces, and localities of a similar nature. It makes its residence by cutting away the mortar with its powerful jaws, and so effectually will it do so, that it sometimes

eats completely through the wall, opening communications between two or more houses. The manner in which it bears heat is wonderful, as it will live within a few inches of a fierce fire.

But the aridity and heat of the atmosphere in which it lives render it very liable to thirst, and it consequently seeks every opportunity of quenching its thirst, by gnawing holes in wet linen, devouring any moist crumbs that may lie on the floor, or boldly climbing the milk-pan, in which latter case it gets a little too much liquid, and is generally "found drowned" next morning. The wings of this insect, as well as those of the field-cricket, are very beautiful, and marked with an elegant pattern. The cricket never appears to use them except at night, when it may be taken on the wing.

**THE MOLE CRICKET.**—The curious insect called the mole-cricket is not uncommon in this country. It inhabits sandy banks, digging deep holes, and forming chambers, in which the eggs are laid. The fore legs closely resemble those of the mole, and are used for the same purpose.

The **LEAF INSECT** is an inhabitant of South America. Not only does it resemble a leaf in shape, but even color, and its legs may be easily mistaken for dry twigs. Even the ramified veinings of the leaf are preserved on its wings. It is singular that while some insects closely resemble vegetables, some vegetables as the Orchidaceæ should as closely resemble insects.

Nearly connected with this insect is the praying mantis, so called from the curious manner in which it holds its fore legs. It is very voracious and exceedingly quarrelsome, fighting with the fore legs, which it uses like a sword. In China the inhabitants keep them in cages, and set them to fight as in other countries certain barbarians keep cocks for the same purpose.

The **COCKROACH** has suffered under the hands of housewives, who express their contempt of it under the name of "black

beetle," a name egregiously false, as, in the first place, it is not black, and in the second place, it is not a beetle. It belongs to the order Orthoptera, and its color is a mahogany red. But, red or black, beetle or not, it is a very great plague, and fully deserves all the maledictions heaped upon it, which are not likely to be decreased by the fact that it is not even an ancient nuisance, but one of modern importation.

Its unpleasant character has caused many plans to be laid for its destruction. Among these, strewing the ground with the peel of cucumber, or with red wafers, is said to be effectual in destroying the cockroaches, but perhaps no plan is so successful as the glass pan with sloping sides, which lets the insects fall in, but prevents their escape altogether.

The eggs of the cockroach are deposited, indeed, in little cases or purses, something like those of the shark, but without the strings. Down one side a thick toothed ridge runs, and by this ridge the young escape when hatched. The male cockroach is furnished with very handsome wings, while the female is entirely destitute of these organs, and only possesses four little scales to mark their position.

The COMMON MAY-FLY is so well known an insect that it needs no long description. It is the fly so familiar to anglers under the name of the "Drake." It is to be found in swarms in the end of May and the beginning of June, rising and falling in the air in its peculiarly undulating manner.

The May-fly spends the first portion of its existence in the water, under the shape of longish grub, with leaf-like appendages to its tail. About May the grubs may be seen to leave the water, and to crawl up the banks or climb the stems of aquatic plants. The skin then splits, and the May-fly creeps out. But it cannot immediately fly, as its wings are soft, and like two split peas. A

short interval of exercise in the open air soon loosens them, and they are gradually shaken out until they have attained their full size, when the insect flies off. There is, however, another change yet. In a short time, the May-fly again settles, and sheds the entire skin a second time, even including the covering of the wings. These cast skins are often found sticking on the bark of willow-trees by the side of waters, and are mistaken for dead May-flies.



THE GREAT DRAGON-FLY.

THE DRAGON-FLY.—Well do the dragon-flies deserve their name. Fierce, voracious, active, and powerful, they are a scourge to the insects. They are on the wing nearly the whole day, seizing, and devouring flies, spiders, and various insects; nor can even the broad-winged butterfly escape them; so voracious are they, that when held in the hand they will devour flies, etc., if held within their reach, and they have even been known, when their

bodies have been severed in two, to eat flies, although they had no stomach to put them in. I once caught a dragon-fly in my net, and while holding it by the wings I presented to it no less than thirty-seven large large flies in rapid succession, all of which it devoured, together with four long-legged spiders. It would probably have eaten as many more had I not been tired of catching flies for it.

The larva of the dragon-fly inhabits the water, and is quite as voracious as in its perfect state. Affixed to its head is a curious set of organs, called the mask, which it can extend, and use for the purpose of seizing its prey, and holding it to its mouth.

THE ANT-LION.—This insect in its perfect form, although it is very elegant, exhibits no peculiarity worthy of notice, but in its larva state its habits are so extraordinary as to have excited general attention. As it is slow and awkward in its movements, it has recourse to stratagem for capturing the agile insects on which it feeds.

Choosing a light sandy soil, it digs for itself a conical pit, at the bottom of which it conceals itself, leaving only its jaws exposed. When an unwary insect approaches too near the edge of the pit, the sand gives away, and down rolls the insect into the very teeth of the concealed ant-lion, who instantly pierces its prey with its calliper-shaped fangs, and sucks out its juices through the jaws, which are hollow. Should, however, the ant-lion miss its prey, and the insect endeavor to escape, its captor instantly makes such a turmoil by tossing up the sand with its closed jaws, and covering each side of the pit with the moving grains, that the insect is tolerably certain to be brought down to the bottom, and is seized by the ant-lion, who immediately drags it below the sand. When the insect is very strong and struggles hard to escape, the ant-lion shakes it about as a dog does a rat, and beats it against the ground until it is disabled.

The TERMITES, or WHITE ANTS, as they are very erroneously called, belong to the Neuroptera, and are therefore not ants at all. These insects live in large societies, and build edifices, sometimes of enormous size, and almost as hard as stone. Twelve feet in height is quite common, so that were we to compare our works with theirs, St. Peter's in Rome and the Capitol at Washington fall infinitely short of the edifices constructed by these little creatures.

The common termite inhabits Africa. Not only does it build these houses, but runs galleries underground, as curiously enough, although blind, it always works either at night or in darkness. In each house or community, there are five different kinds of termites: 1, the single male, or king, whose life is very short; 2, the single female, or queen: these are the perfect insects, and have had wings, but have lost them soon after their admission into their cell; they also have eyes; 3, the soldiers or fighting men: these possess large jaws, do no work, but repel adversaries and watch as sentinels; 4, the pupæ, who resemble the workers, except that they possess the rudiments of wings; and 5, the larvæ, or workers. These do all the *work*, i. e., they collect food, attend to the queen, and watch over the eggs and young, and build and repair their castle. These are more numerous than all the other kinds.

On the approach of the rainy season, the pupæ obtain wings and issue forth in swarms. Few, however, survive. Myriads are devoured by birds, reptiles, and even by man; and many are carried out to sea and perish there. Those that do escape are speedily found by the laborers, who inclose a pair in a clay cell from which they never emerge. The male soon dies, but the female, after rapidly increasing to nearly three inches in length and one in breadth, continues to lay eggs unceasingly for a long time. This cell becomes the nucleus of the hive, and round it all the other cells and galleries are built.

These insects are terribly destructive, as they eat through wooden beams, furniture, etc., leaving only a thin shell, which is broken down with the least extra weight, and many are the occasions when an unsuspecting individual, on seating himself on an apparently sound sofa or chair, finds himself, like Belzoni in the Pyramid, reposing among a heap of dust and splinters. Mr. Cumming describes the habitation of the white ant in these terms :

“Throughout the greater part of the plains frequented by blesboks, numbers of the sunbaked hills or mounds of clay formed by the white ants occur. The average height of the ant-hills in these districts is from two to three feet. They are generally distant from one another from one to three hundred yards, being more or less thickly placed in different parts. These ant-hills are of the greatest service to the hunter, enabling him with facility to conceal himself on the otherwise open plain.”

THE CADDIS-FLY\*.—This fly is well known to every angler both in its larva and in its perfect state. The larva is a soft white worm, of which fishes are exceedingly fond, and it therefore requires some means of defence.

It accordingly actually makes for itself a movable house of sand, small stones, straws, bits of shells, or even small living shells, in which it lives in perfect security, and crawls about in search of food, dragging its house after it.

When it is about to become a pupa, it spins a strong silk grating over the entrance of its case, so that the water necessary for its respiration can pass through, but at the same time all enemies are kept out. When the time for its change has arrived, the pupa bites through the grating, rises to the surface, and crawls out of the reach of the water, which would soon be fatal to it. The skin then splits down the back, and the perfect insect emerges.

THE ICHNEUMON-FLY.—We have now reached a most important and interesting order. In it are contained the bees, wasps, ants, etc. This is the only order where the insects possess stings. The wings are four in number, with certain veinings upon them, the shape and number of which in many cases distinguish the species.

The ichneumons form a very large section. They are most useful to mankind, as one ichneumon will destroy more caterpillars than a man could kill in his lifetime. They do not, as most other insects, deposit their eggs upon vegetable or dead animal substances, but they actually bore holes in other insects, while they are still in the larva state, and leave the eggs to hatch in their living receptacle.

I have examined hundreds of caterpillars in the course of dissection, and have seldom found them free from ichneumons. I took out of one small goat caterpillar 137 of these insidious destroyers. I found them useful auxiliaries in dissection, as they had usually consumed all the fat, leaving the important organs ready cleared.

The WOOD-ANT is the largest of our American species. It is found principally in woods, and builds a large nest, which looks like a hillock of sand and earth, intermixed with bits of stick, leaves, etc. The interior of this hill is chambered out into a variety of apartments, and is traversed by passages. The so-called ants' eggs are not eggs at all, but the *pupa* cases of the insect, and, if opened, the perfect insect is seen curled up inside.

In the autumn the ants burst forth by thousands and may be seen hovering in clouds above the nest. Their beautiful wings do not last long, for when a female ant escapes, and founds an infant colony, her wings are soon lost, just as a highly accomplished young lady gives up her velvet painting and cross-stitchery when she mar-

ries and has a large family. Few *do* escape, as the birds find these living clouds a most agreeable and plentiful repast.

Ants do not, as has been so frequently said, lay up stores of corn for the winter, for they are in a state of torpidity during the cold months, and require no food. Moreover, an ant would find as much difficulty in eating or digesting a grain of corn as we should in devouring a truss of straw. In each nest are three kinds of ants—males, females, and neuters, or workers.

THE WASPS.—Let us honor the wasps as the first paper-makers, for of that material is the nest composed. The paper is rough and coarse certainly, but it is still paper. The wasp, in order to make this paper, rasps off fibres of decayed wood, which it afterward mashes with its teeth into a pulp, and then spreads the pulp in layers, when it hardens and forms coarse paper.

The dreaded HORNET is usually found in woods, where it builds its nest in the hollows of trees. A deserted hut is a favorite spot, and when occupied by a full nest of hornets is not particularly safe to enter, as the sting of this insect is peculiarly severe. It feeds upon other insects, and even attacks and devours the formidable wasp.

The COMMON WASP builds its nest in the ground, usually in banks. The combs are laid horizontally, and not vertically like those of the bee. As the cells are made of paper, they will not hold honey, nor does the wasp endeavor to collect honey, although it is very fond of it, and never loses an opportunity of robbing a beehive, although its natural food is flies or other animal substances. Nor does it despise sugar, as every grocer's window testifies.

Very few wasps survive the winter, and those who do immediately set about forming a new nest. Only a few cells are made at first, but the number rapidly increases, until the nest is furnished with about sixteen thousand cells. Some wasps build nests upon

the branches of trees, and others suspend them from the branches.

THE BEE.—This useful little creature is so well known that a lengthened description of it would be useless. A merely general sketch will be quite sufficient.

The cells of the bee are, as is well known, made of wax. This wax is secreted in the form of scales under six little flaps situated on the under side of the insect. It is then pulled out by the bee,



THE BEE.

and moulded with other scales until a tenacious piece of wax is formed. The yellow substance on the legs of the bees is the pollen of flowers. This is kneaded up by the bees, and is called bee-bread. The cells are six-sided, a form which gives the greatest space and strength with the least amount of material, but the method employed by the bees to give the cells that shape is not known. The cells in which the drone or male bees are hatched, are much larger

than those of the ordinary or worker bee. The edges of the cells are strengthened with a substance called propolis, which is a gummy material procured from the buds of various trees. This propolis is also used to stop up crevices and to mix with wax when the comb has to be strengthened.

The royal cells are much larger than any others, and are of an oval shape. When a worker larva is placed in a royal cell, and fed in a royal manner, it imbibes the principles of royalty, and becomes a queen accordingly. This practice is adopted if the queen bee should die, and there be no other queen to take her place.

The queen bee is lady paramount in her own hive, and suffers no other queen to divide rule with her. Should a strange queen gain admittance, there is a battle at once, which ceases not until one has been destroyed. At the swarming time, the old queen is sadly put out by the encroachments of various young queens, who each wish for the throne, and at last is so agitated that she rushes out of the hive, attended by a large body of subjects, and thus the first swarm is formed. In seven or eight days, the queen next in age also departs, taking with her another supply of subjects. When all the swarms have left the original hive, the remaining queens fight until one gains the throne.

The old method of destroying bees for the sake of the honey was not only cruel but wasteful, as by burning some dry "puff-ball" the bees are stupefied, and shortly return to consciousness. The employment of a "cap" on the hive is an excellent plan, as the bees deposit honey alone in these caps, without any admixture of grubs or bee-bread. Extra hives at the side, with a communication from the original hive, are also useful. The queen bee lays about eighteen thousand eggs. Of these about eight hundred are males or drones, and four or five queens, the remainder being workers.

THE SWALLOW-TAILED BUTTERFLY.—We now arrive at the Haustellate Insects, so called because they suck liquid food through an apparatus resembling the proboscis of an elephant. The first order of haustellate insects is the Lepidoptera, containing the butterflies and moths. The butterflies always fly by day, from which circumstance they are sometimes called Diurnal Lepidoptera. Most of the moths fly by night, and are called Nocturnal Lepidoptera. Butterflies are usually lighter in the body than moths, from which insects they are easily distinguished by the shape of the antennæ, which in the butterflies are slender and end in a small knob, but in the moths terminate in a point, and are often beautifully fringed.

The name Lepidoptera is given to these insects because their wings are covered with myriads of minute scales, by which the beautiful coloring of the wings is produced.

The RED ADMIRAL is one of the most gorgeous of our butterflies. The color of the wings is a deep black, relieved by a broad band of scarlet across each, and a series of semicircular blue marks edge each wing. It is usually found in woods and lanes, where there are nettles, as the larva feeds upon that plant. It appears about the middle of August.

The DEATH'S-HEAD MOTH is the largest of the British Lepidoptera, as it not unfrequently measures nearly six inches across the wings. Its rather ominous name is derived from the singular marking in the thorax, which does not require much imagination to represent a scull and cross-bones. Some naturalists have asserted that this moth makes its way into bee-hives, and robs the inhabitants of their honey, disarming their resentment by a curious squeaking noise which it has the power of producing.

In common with many other nocturnal insects, the eyes of the death's-head moth shine at night like two stars, which adds considerably to the terror inspired by its appearance.



THE BUTTERFLIES.

THE HUMMING-BIRD MOTH.—This curious insect is called the humming-bird moth, because its appearance when on the wing exactly resembles that of a humming-bird. It feeds on the wing as the bird does, hovering before each flower and sucking out the honey by means of its very long proboscis.

It is very shy, and darts off if the slightest movement is made ; but if the spectator remains perfectly quiet, the moth sees no danger, and will continue its meal within a yard of him. The moth appears to gain confidence if it is not disturbed, and in a few days will become almost tame, permitting the spectator to whom it is accustomed to approach quite closely without appearing alarmed.

THE TIGER-MOTH.—This common but beautiful moth is found in the beginning of autumn. It runs on the ground with such swiftness as to be often mistaken for a mouse. I have more than once seen a kitten chasing a tiger-moth among the flowers in a garden, evidently deceived by its resemblance to a mouse.

The larva is popularly called “the woolly bear.” It is rather large, and is surrounded with tufts of long elastic hairs of a reddish brown color, which serve as a defence against many enemies. When disturbed, it rolls itself round, just as a hedgehog does, and if on a branch, suffers itself to fall to the ground, when the long hairy covering defends it from being injured by the fall. When the caterpillar is about to change into a pupa, it spins a kind of hammock, and lies there until it comes forth as a moth. The color and markings of this moth vary considerably. The usual tints are: the thorax brown, the body red, striped with black ; the two anterior wings are cream color, marked with bold patches of deep brown ; the posterior wings are bright red, spotted with bluish black.

The MANY-PLUMED MOTH is found toward the close of autumn, usually running about windows. It is very small, measuring barely half an inch across the wings. The structure of the wings is very curious,

each of the two anterior wings being divided into eight beautiful feather-like rays, and each of the posterior into four rays. Nearly allied to this are the common Feather Moths, the most common of which is the White-plumed Moth, whose wings measure nearly an inch across, and are divided into five feathered rays.

All are familiar with the COMMON GNAT. This pretty tormentor passes its larval existence in the water, in which state thousands may be seen in any uncovered water-butt, wriggling about with the most untiring energy, or reposing head downward, only leaving the end of the tail at the surface. The reason for this is very curious. This larva breathes through its tail, and is moreover enabled by means of a fringe of hairs to carry air down with it.

It is a singular circumstance, that although the larva lives in the water, yet were either the eggs or the perfect insect to be submerged, they would be destroyed. The instinct of the gnat, in order to fulfil all three conditions, is very beautiful. When the gnat wishes to deposit its eggs, it rests itself on a leaf or twig on the surface of the water; it then takes each egg separately, and fastens them side by side in such a manner that they actually form a little boat, which will neither fill with water nor upset, however the water may be agitated. In a few days the eggs are hatched, when a little lid opens in the under end of each egg, and down tumbles the larva into the water. After remaining in the water for some days it assumes the pupa form. In this state it floats at the surface with the back of the thorax uppermost. Soon this splits, and the insect emerges, standing on its own cast skin, which forms a raft for it till its wings are fully dry, when it takes to flight, leaving behind it the empty shell floating on the water. This change may be witnessed any warm day in summer.

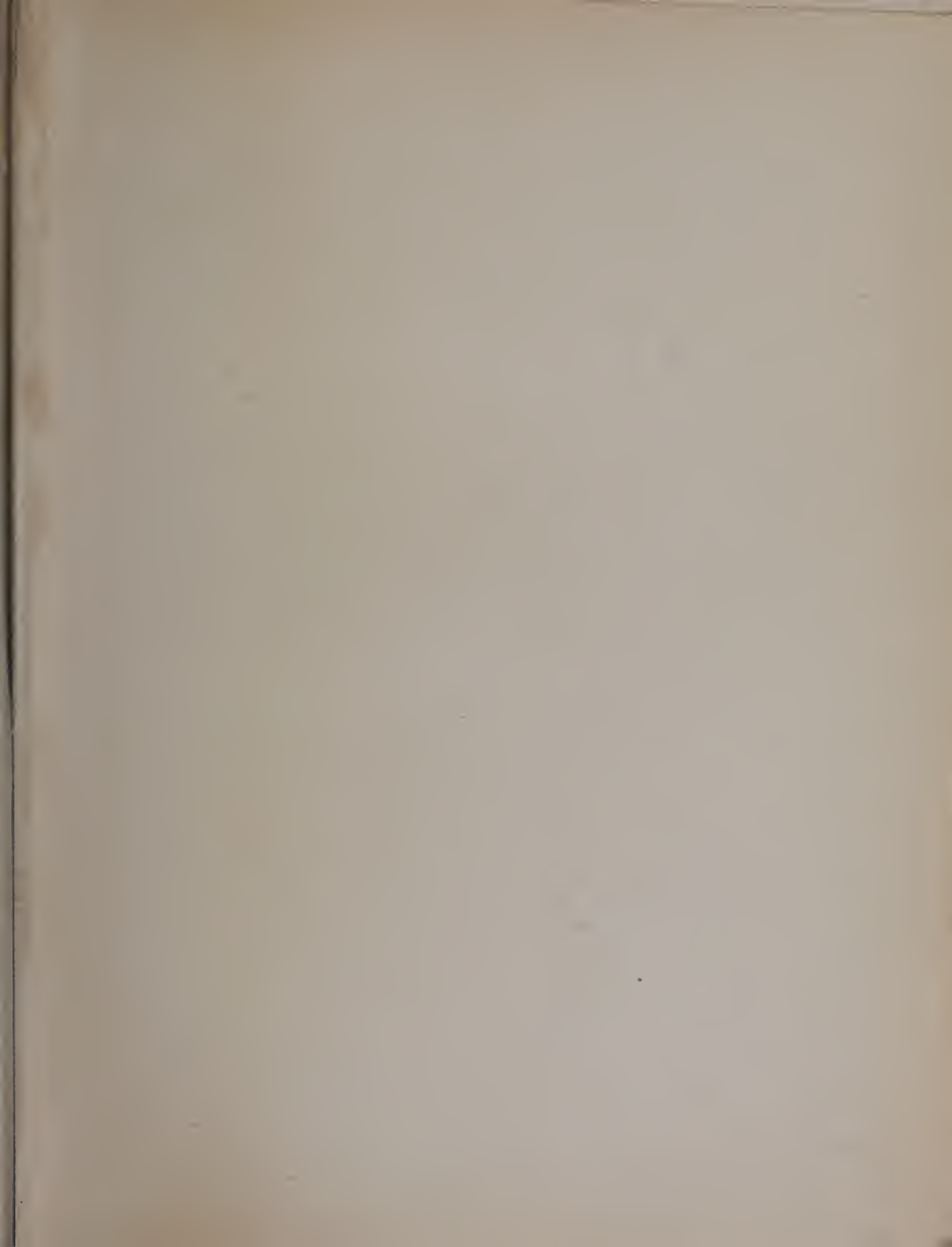
The GADFLY has from the most ancient times been known as the terror of the herd. At the sound of its approach the cattle are driven almost mad with terror. The young gadflies are nourished under the skin, where they remain until they are fit to pass into the pupa state, when they bury themselves in the ground, and after a few days spent under the earth, issue forth in their perfect state.

THE HUMBLE-BEE FLY.—This very curious insect is found in the early days of spring, and may be seen hovering over the primroses and other spring flowers. It feeds in the same manner as the humming-bird moth, and much resembles that insect in many of its habits.

THE FLEA.—The strength and agility of this curious but annoying little insect is perfectly wonderful. Many of my readers have doubtless seen the exhibition of the Industrious Fleas, who drew little carriages, and carried comparatively heavy weights with the greatest ease.

The apparatus with which it extracts the blood of its victims is very curious, and forms a beautiful object under a microscope of low power. Its leap is tremendous in proportion to its size. This property it enjoys in common with many other insects, among which the Common Grasshopper, the Froghopper, and the Halticas or Turnip-flies are conspicuous. In all these insects the hinder pair of legs are very long and powerful.

THE END.



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